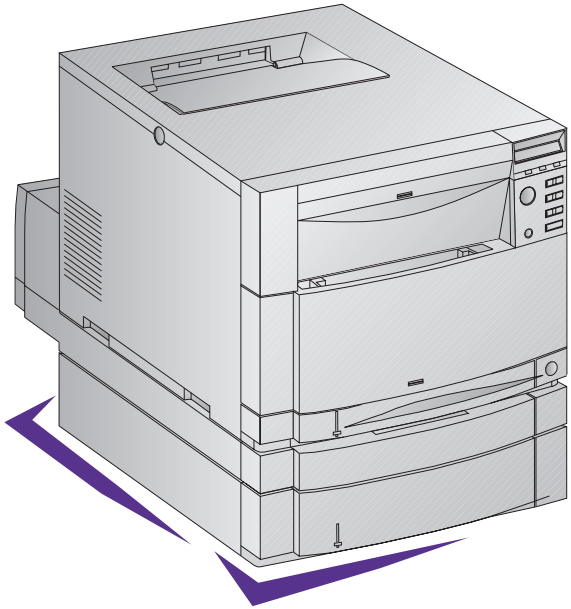
HEWLETT® PACKARD

Color LaserJet™

4500, 4500 N, 4500 DN Printer

Service Manual



HP Color LaserJet 4500, 4500 N, 4500 DN Printer

Service Manual

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Conventions

This manual uses the following conventions:

Color is used to emphasize items that are important to the material under discussion.

Bold is used for emphasis, particularly in situations where *italic* type would be confusing.

Italic type is used to indicate related documents or emphasis.

DISPLAY type indicates text as seen on the printer control panel display.

Commands you use on a computer keyboard or on the printer control panel are shown in [Keycap]. Two examples are [Select], and [Value +].

COURIER type indicates text that you type on a computer keyboard exactly as shown.

Hint Hints are used to suggest an action that may simplify the process.

Note Notes contain important information set off from the text.

CAUTION Caution messages alert you to the possibility of damage to equipment or loss of data.

WARNING! Warning messages alert you to the possibility of personal injury.

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1 Printer description

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Overview

This chapter discusses the following topics:

- Printer features
- Identification
- Site requirements
- Printer specifications
- Printer assemblies
- Media requirements
- Environmental Product Stewardship Program
- Regulatory statements
- Safety information

Printer features

The HP LaserJet 4500 printer family pictured in Figure 1-1 has three models.

- The HP LaserJet 4500 printer is the base model.
- The HP LaserJet 4500 N printer includes the base model with an HP JetDirect 600N Print Server (network card).
- The HP LaserJet 4500 DN printer includes the base model with an HP JetDirect 600N Print Server (network card), a 500-sheet paper feeder, and a duplex printing accessory.

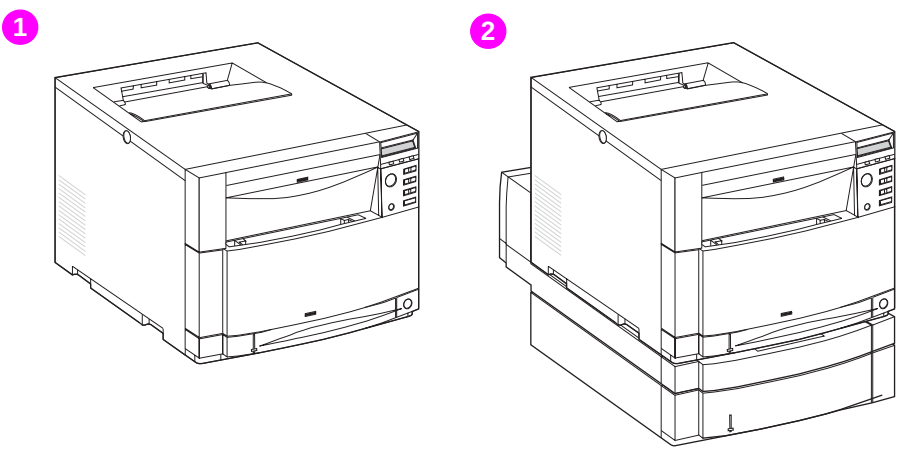

Figure 1-1 **HP Color LaserJet 4500 family printers**

1 HP Color LaserJet 4500 and 4500 N printers

2 HP Color LaserJet 4500 DN printer

This printer combines the quality and reliability of Hewlett-Packard printers with the features listed in Table 1-1 below. For more information on printer features, refer to the Hewlett-Packard website at http://www.hp.com.

Table 1-1 Printer features

Feature	Description
Connectivity	• Bidirectional parallel port (requires a “C” connector) • Two enhanced input/output (EIO) slots • Optional HP JetDirect 600N Print Server (network card) (included with the HP Color LaserJet 4500 N and 4500 DN printers)
Duplex	• Optional duplex printing accessory; mounts directly beneath the printer for two-sided printing • Requires 64 MB of memory **Note:** If the 500-sheet paper feeder (Tray 3) is installed, the duplex printing accessory must be positioned between the printer and Tray 3.
Environmental	• PowerSave setting (meets ENERGY STAR guidelines) • High content of recyclable components and materials
Fonts	• 80 internal fonts • HP FontSmart software
Memory—standard	• 32 MB RAM (Base) • Memory Enhancement Technology (MEt), which automatically compresses data to use RAM more efficiently
Memory—optional	• Install 4, 8, 16, 32 or 64 MB DIMMs into the printer’s three DIMM slots. Synchronous DRAM modules do not need to be configured in pairs (in corresponding left and right slots). Do not exceed 208 MB of total printer memory.

Table 1-1 Printer features (continued)

Feature	Description
Paper handling—input (tray capacity)	The capacities will vary depending on the media being used (for example, transparencies, labels, heavier media, and envelopes): ● **Tray 1:** 150-sheet multipurpose tray. Use for 75 g/m^2 (20 lb) paper stock. ● **Tray 2:** 250-sheet standard cassette ● **Tray 3:** Optional 500-sheet paper feeder
Paper handling—output (face-down, correct order output)	● Top output bin holds up to 250 sheets of standard paper ● Rear output bin holds up to 100 sheets of standard paper. (The output is in reverse order, facing up.)
Printer language support	● HP PCL5c ● PostScript(TM) Emulation ● Auto language switching
Paper sizes supported	● A4/Letter ● Legal ● Executive ● JIS B5 ● A5 ● Custom (B5 ISO)
Print speed—monochrome printing	● 16 pages per minute (ppm) ● 8 ppm for transparencies, heavy paper, and glossy paper
Print speed—color printing	● 4 ppm ● 2 ppm for transparencies, heavy paper, and glossy paper
Standard interfaces	The printer comes equipped with two enhanced input/output (EIO) slots **Note:** If the printer is not configured with a network interface card, connect the printer using a bidirectional parallel cable (IEEE-1284 compliant) with a “C” connector.

Identification

Model and serial numbers

The model number and serial numbers are listed on identification labels located on the rear of the printer. The model number is alphanumeric, such as C4084A, C4089A, and C4094A for the HP Color LaserJet 4500, 4500 N, and 4500 DN printers.

The serial number contains information about the country of origin, the revision level, the production code, and the production number of the printer.

The rear labels also contain power rating and regulatory information. Converting the voltage on the printer can damage the printer. Do not use any voltage other than the operating voltage. Any attempt to convert operating voltages will void the product warranty (for example, changing a 110V printer to a 220V printer).

Site requirements

Locating and placing the printer correctly are important in maintaining the performance level that has been set at the factory. In particular, be sure to adhere to the environmental specifications listed in this chapter. The following are recommendations for locating and placing the printer:

- Install in a well-ventilated, dust-free area.
- Install on a hard, level surface (at an angle not more than 2°)
  - For the HP Color LaserJet 4500 and 4500 N, the surface must support 51 kg (112 lb)
  - For the HP Color LaserJet 4500 DN, the surface must support 77 kg (169 lb)
  - The surface must support all four corners of the 500-sheet paper feeder.
- Install where the temperature and humidity do not change abruptly. Do not install near water sources, humidifiers, air conditioners, refrigerators, or other major appliances.
- Do not expose the printer to direct sunlight, dust, open flames, or ammonia fumes.
- Install the printer away from walls or other objects. There must be enough space around the printer for proper access and ventilation. See Figure 1-2 on page 8.
- Install the printer away from the direct flow of exhaust from air ventilation systems.

Space requirements

The printer requires the top and side clearances shown below.

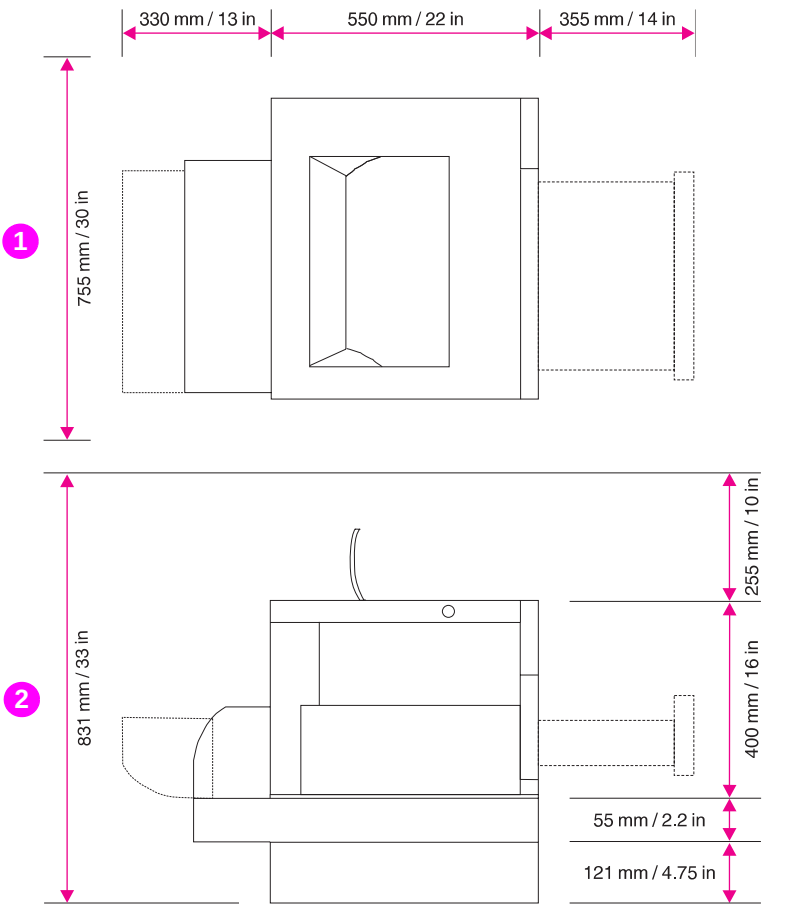

Figure 1-2 **Space requirements**

1 Top view

2 Side view

Electrical specifications

Table 1-2 lists the electrical specifications required to run the printer safely.

Table 1-2 Electrical specifications

Item	110-volt models	220-volt models
Power requirements	100-127 V (+/- 10%) 50/60 Hz (+/- 2 Hz)	220-240 V (+/- 10%) 50/60 Hz (+/- 2 Hz)
Power consumption (typical) During printing During standby[1] During PowerSave	 470 W (average) 80 W (average) < 45 W	 480 W (average) 90 W (average) < 45 W
Minimum recommended circuit capacity for typical product	16.0 A at 120 V	7.1 A at 220 V

[1]When the printer is in standby (off) mode, a minimal amount of energy is still consumed.

Environmental specifications

Keep the printer within the environmental conditions shown in Table 1-3 for optimum performance.

Table 1-3 Environmental specifications

Item	Operating
Temperature Recommended Allowed	 20 to 26° C (68 to 79° F) 15 to 30° C (59 to 86° F)
Humidity Recommended Allowed	 20 to 50% RH 10 to 80% RH
Altitude Allowed	 0 to 3100 m (0 to 10,000 ft)

Consumable storage requirements

The life of consumables is greatly affected by their storage environment. Use Table 1-4 to determine the shelf life of stored consumables.

Table 1-4 Consumable storage requirements

Item	Storage time	Storage condition
Temperature	Normal (maximum of 2.5 years)	0 to 35° C (32 to 95° F)
	Severe (maximum of 18 days)	High 35 to 40° C (95 to 104° F) Low 0 to -20° C (32 to -4° F)
Maximum temperature change rate	40 to 15° C (104 to 59° F) within 3 minutes -20 to 25° C (-4 to 77° F) within 3 minutes	
Humidity	Normal (maximum of 2.5 years)	35 to 85% RH
	Severe (maximum of 18 days)	High 85 to 95% RH Low 10 to 35% RH
Atmospheric pressure	460 to 760 mm Hg	
Total storage time	1 year	

Printer specifications

Table 1-5 describes the dimensions of the printer.

Table 1-5 Printer dimensions

	HP Color LaserJet 4500, 4500 N	HP Color LaserJet 4500 DN
Height	394 mm	394 mm
Width	495 mm	495 mm
Depth	546 mm	545 mm
Weight	57 kg (125 lb)	75 kg (165 lb)

Table 1-6 lists the acoustic emissions of the printer when it is printing and when it is in standby mode.

Table 1-6 Acoustic emissions

Operating position Printing Standby	Per ISO 9296, DIN 45635, T.19 L_{PA} 58 dB(A) L_{PA} 49 dB(A)
Bystander 1m Printing Standby	Per ISO 7779, DIN 45635, T.19 L_{PA} 52 dB(A) L_{PA} 45 dB(A)
Sound power Printing Standby	Per ISO 9296 L_{WAd} = 6.6 bels(A) L_{WAd} = 5.8 bels(A)

Note This product emits a sound intensity level, L_{WAd}, at 6.4 bel during printing. Do not place the printer in close proximity to users.

Duty Engine maximum is 35,000 ppm.

Printer assemblies

Figures 1-3 and 1-4 show the location of each major assembly in the printer. These assemblies are described in Chapter 3.

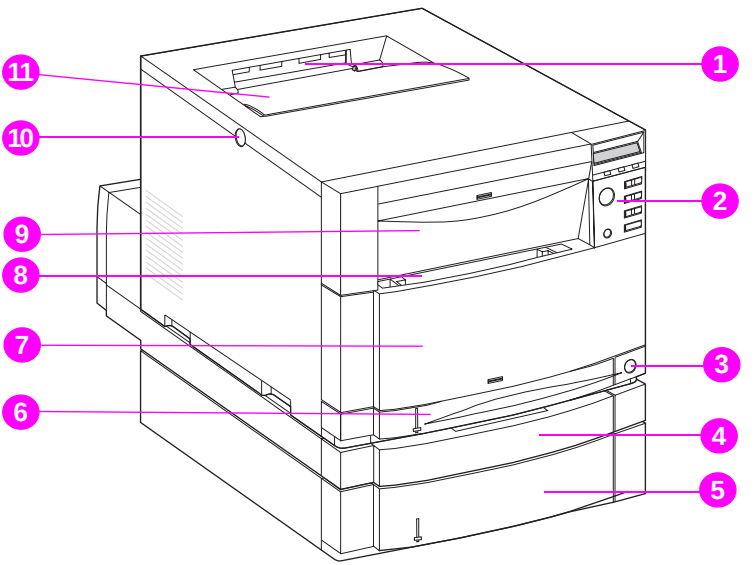

Figure 1-3 **Front view (shown with 500-sheet paper feeder and duplex printing accessory)**

1 Top output bin

2 Printer control panel

3 Power switch (standby button)

4 Duplex printing accessory drawer (optional on 4500 and 4500 N models)

5 Tray 3 (500-sheet paper feeder, optional on 4500 and 4500 N models)

6 Tray 2 (250 sheets of standard paper)

7 Middle front drawer (transfer belt access)

8 Tray 1 (150-sheet multipurpose tray)

9 Upper front drawer (imaging drum access)

10 Top cover door release button

11 Top cover door (toner cartridge access)

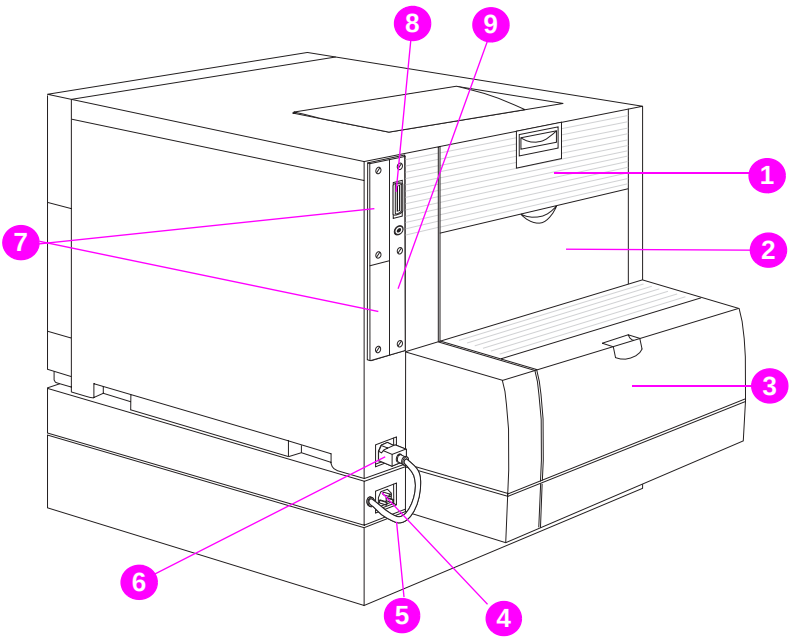

Figure 1-4 **Rear view (shown with 500-sheet paper feeder and duplex printing accessory)**

1 Rear door (fuser access)

2 Rear output bin door

3 Cover for duplex printing accessory

4 Power receptacle for duplex printing accessory

5 Power cord

6 Printer power receptacle

7 EIO slots

8 Parallel connector (“C” connector)

9 Memory access

Media requirements

Selecting print media

You can use many types of paper and other print media with this printer. This section provides guidelines and specifications for selecting and using different print media.

Before purchasing any media or specialized forms in quantity, verify that your paper supplier obtains and understands the print media requirements specified in the *HP LaserJet Family Paper Specification Guide*. The guide is available through HP Direct. See Appendix D in the online user guide for ordering information.

It is possible that media could meet all of the guidelines in this chapter and still not print satisfactorily. This may be due to abnormal characteristics of the printing environment or to other variables over which Hewlett-Packard has no control (for example, extremes in temperature and humidity).

Hewlett-Packard recommends testing any media before buying it in large quantities.

CAUTION Using media that does not conform to the specifications listed here or in the *HP LaserJet Family Paper Specification Guide* can cause problems that require service. This service is not covered by the Hewlett-Packard warranty or service agreements.

Media specifications

For optimum results, use conventional 75 g/m^2 (20 lb) xerographic paper. Verify that the paper is of good quality and is free of cuts, nicks, tears, spots, loose particles, dust, wrinkles, curls, or bent edges.

Supported media weights and sizes

Table 1-7 shows the media types and sizes supported by the printer and the printer accessories.

Table 1-7 Supported media specifications

Tray	Supported media	Media specifications	Capacity
Tray 1	Paper A4/Letter Legal Executive JIS B5 A5 Custom Minimum Size: 76 x 127 mm (3 x 5 in) Maximum Size: 216 x 356 mm (8.5 x 14)	Single-sided: 60 to 159 g/m^2 (16 to 42 lb) If less than or equal to 148 mm width: 60 to 176 g/m^2 (16 to 47 lb) If more than or equal to 148 mm width: 60 to 135 g/m^2 (16 to 36 lb) Two-sided: 64 to 105 g/m^2 (17 to 28 lb)	150 sheets of 75 g/m^2 (20 lb) paper
	Transparencies Glossy Paper	0.13 mm (5 mil) 120 g/m^2 (32 lb/80 lb text)	Limit of 50 Limit of 50 sheets
	Envelopes (Tray 1 only) Com10 Monarch C5 DL B5 (JIS)	Maximum weight: 90 g/m^2 (24 lb)	Limit of 10
	Labels (Tray 1 only)		Limit of 50
	Cardstock (Postcards) (Tray 1 only)	Maximum weight: 176 g/m^2 (47 lb) Maximum size: 200 mm x 148 mm (7.87 in x 5.82 in)	Do not load more than the maximum stack height of 15 mm (0.6 in)

Table 1-7 Supported media specifications (continued)

Tray	Supported media	Media specifications	Capacity
Tray 2*	Paper A4/Letter Legal Executive JIS B5 A5 Custom (B5 ISO)**	60 to 105 g/m^2 (16 to 28 lb)	250 sheets of 75 g/m^2 (20 lb) paper
	Transparencies Glossy Paper	0.13 mm (5 mil) 120 g/m^2 (32 lb/80 lb text)	Limit of 50 Limit of 200 sheets
Tray 3* (optional)	Paper A4/Letter Legal Executive JIS B5 Custom (B5 ISO)**	60 to 105 g/m^2 (16 to 28 lb)	500 sheets of 75 g/m^2 (20 lb) paper
	Transparencies Glossy Paper	0.13 mm (5 mil) 120 g/m^2 (32 lb/80 lb text)	Limit of 50 Limit of 500 sheets
Duplex printing accessory (optional)	Paper A4/Letter Legal Executive JIS B5	64 to 105 g/m^2 (17 to 28 lb)	

*Trays 2 and 3 do not support the range of custom sizes available in Tray 1.
**Trays 2 and 3 use “custom” size—specifically for B5 ISO.

Non-supported media

Use the following guidelines to avoid poor print quality or damage to your printer:

- Do not use paper that is too rough.
- Do not use paper that is embossed or coated unless it is specifically recommended for use in this printer.
- Do not use paper with cutouts or perforations other than standard 3-hole punched paper.
- Do not use multipart forms.
- Do not use paper with irregularities such as tabs or staples.
- Do not use letterhead paper with low temperature dyes or thermography. Preprinted forms or letterhead must use inks that can tolerate temperatures of 190° C (374° F) for 0.1 second.
- Do not use any media that produces hazardous emissions, or that melts, offsets, or discolors when exposed to 190° C (374° F) for 0.1 second.
- Do not use paper that has already been printed on or fed through a photocopier or printer.
- Do not use paper with a watermark if you are printing solid patterns.

Printing on special media

Use these guidelines when printing on special types of media.

For optimum results, use conventional 75 g/m^2 (20 lb) xerographic paper. Verify that the paper is of good quality and is free of cuts, nicks, tears, spots, loose particles, dust, wrinkles, curls, or bent edges.

Transparencies

When printing on transparencies, use the following guidelines:

- Do not send transparencies from Tray 2 to the rear output bin. The toner will be warm and may cause the transparencies to stick together.
- Send transparencies to the top output bin.
- Handle transparencies using the edges. Oils from your fingers can remain on the transparency and can cause print quality problems.
- Use only overhead transparencies recommended for use in this printer. Table 1-8 describes the recommended specifications for transparencies.

CAUTION Hewlett-Packard recommends using HP Color LaserJet Transparencies with this printer. HP products are designed to work together for optimum printing results.

Table 1-8 Printing on transparencies

Description	Specifications
Electrical surface	2.0 to 15 x 10 ohms per square inch
Resistivity	Overhead transparencies must be able to withstand the heat and pressure of the fusing process.
Fusing compatibility	Materials must not discolor, melt, offset, or release hazardous emissions when heated to 190° C (374° F) for 0.1 second.
Caliper (thickness)	0.12 mm (0.0048 in) to 0.13 mm (0.0052 in)

Glossy paper

For optimum results when printing on glossy paper, select the glossy print setting in the printer driver. You can also use the printer control panel to set the media type to GLOSS for the input tray you are using. Because this setting affects all print jobs, it is important to return the printer to its original settings once your job has printed. See the section in the online user guide on configuring input trays.

Colored paper

Colored paper should be of the same high quality as white xerographic paper. Pigments used must be able to withstand the printer's fusing temperature of 190° C (374° F) for 0.1 second without deterioration. Do not use paper with a colored coating that was added after the paper was produced.

The printer creates colors by printing patterns of dots, overlaying and varying their spacing to produce various colors. Varying the shade or color of your paper will affect the shades of your printed colors.

Heavy paper

Use Tray 1 for paper that is heavier than 105 g/m^2 (28 lb). For optimum results when printing on heavy paper, select the heavy print setting in the printer driver. You can also use the printer control panel to set the media type to HEAVY for the input tray you are using. Because this affects all print jobs, it is important to return the printer to its original settings once your job has printed.

CAUTION Do not use paper that is heavier than the recommended paper specification for this printer. Doing so can cause misfeeds, paper jams, inferior print quality, and excessive mechanical wear. See Table 1-7 for supported paper types and sizes.

Envelopes

Envelopes can only be printed from Tray 1. For information on loading envelopes, see the section in the online user guide on loading envelopes into Tray 1.

Adhering to the following guidelines will help ensure proper printing of envelopes and help prevent printer jams:

- Do not load more than 10 envelopes into Tray 1.
- The weight rating of envelopes should not exceed 90 g/m^2 (24 lb).
- Envelopes should be flat.
- Envelopes must not be wrinkled, nicked, or otherwise damaged.
- Envelopes with peel-off adhesive strips must use adhesives that can withstand the heat and pressures of the printer's fusing process.
- Envelopes should be loaded with the flaps facing away from the printer and toward the left side of the printer.

CAUTION To prevent severe printer damage, do not use envelopes that have windows, clasps, snaps, or synthetic materials.

Labels

Note To print labels, Hewlett-Packard recommends configuring Tray 1 as a cassette and setting the tray's media type to LABELS in the printer control panel.

When printing labels, use the following guidelines:

- Verify that the label's adhesive material can tolerate temperatures of 190° C (374° F) for 0.1 second.
- Verify that adhesive material is not exposed between the labels. Exposed areas can cause labels to peel off during printing, which can cause printer jams. Exposed adhesive can also cause damage to printer components.
- Do not re-feed a sheet of labels.
- Verify that labels lie flat.
- Do not use labels that are wrinkled, bubbled, or otherwise damaged.

Preprinted forms and letterhead

Observe the following guidelines for best results with preprinted forms and letterhead:

- Forms and letterhead must be printed with heat-resistant inks that will not melt, vaporize, or release hazardous emissions when subjected to the printer's fusing temperature of approximately 190° C (374° F) for 0.1 second.
- Inks must be non-flammable and should not adversely affect any printer rollers.
- Forms and letterhead should be sealed in a moisture-proof wrapping to prevent changes during storage.
- Before you load preprinted paper such as forms and letterhead, verify that the ink on the paper is dry. During the fusing process, wet ink can come off of preprinted paper.

Recycled paper

This printer supports the use of recycled paper. Recycled paper must meet the same specifications as standard paper (refer to the *HP LaserJet Family Paper Specification Guide*). The guide is available through HP Direct. See Appendix D in the online user guide for ordering information. Hewlett-Packard recommends that recycled paper contain no more than 5 percent groundwood.

Environmental Product Stewardship Program

Protecting the environment

Hewlett-Packard Company is committed to providing quality products in an environmentally sound manner. This HP LaserJet printer has been designed with several attributes to minimize impacts on our environment.

This HP LaserJet printer design eliminates:

- **Ozone Emissions**—This product has been designed to minimize ozone emissions and avoid the need for an ozone filter.
- **CFC Usage**—Class I U.S. Clean Air Act stratospheric ozone-depleting chemicals (chlorofluorocarbons [CFCs], for example) have been eliminated from the manufacturing sites that produce this printer. This practice coincides with the 1987 “Montreal Protocol on Substances that Deplete the Ozone Layer” and its subsequent amendments. CFCs are not used in manufacturing of the packaging.

This HP LaserJet printer design reduces:

- **Energy consumption**—Energy usage drops from 120 watts (W) during printing to as low as 30W (45W for a printer with optional accessories) while in low-power (PowerSave) mode. Not only does this save natural resources, but it also saves money without affecting the high performance of this printer. This product qualifies for the ENERGY STAR Program (U.S. and Japan). ENERGY STAR is a voluntary program established to encourage the development of energy-efficient office products. ENERGY STAR is a U.S. registered service mark of the U.S. EPA.

As an ENERGY STAR partner, Hewlett-Packard Company has determined that this product meets ENERGY STAR Guidelines for energy efficiency.

- **Paper use**—The printer’s optional duplex printing accessory provides two-sided printing, reducing paper usage and the resulting demands on natural resources.

The design of this HP LaserJet printer facilitates the recycling of:

- **Plastics**—Major plastic parts have markings that enhance the ability to identify plastics for recycling purposes at the end of the printer's life. The plastics used in the printer housing and chassis are technically recyclable.
- **HP toner cartridges/photoconductive drum**—In many countries, this product's toner cartridge/drum can be returned to HP at the end of its useful life. A prepaid shipping label and instructions on how to return the toner cartridge/drum are included with the replacement toner cartridge/drum. If your country is not listed in the replacement's brochure, call your local HP Sales and Service Office for further instructions.

HP cartridge recycling program information:

Since 1990, the HP LaserJet Toner Cartridge Recycling Program has collected more than twelve million cartridges that otherwise would have been discarded into landfills or similar facilities. This rapidly growing program returns used cartridges to the manufacturing process, thus conserving a variety of resources. Once a cartridge is returned through the prepaid return program, it is disassembled. The reusable components and the plastic housing are cleaned and inspected for quality conformance. After passing strict inspection procedures, materials such as nuts, screws, and clips are reclaimed and used to produce new cartridges. Remaining materials, like the photoconductive drum, are melted down and used as raw materials for a variety of other products. By the weight of the materials returned, over 95 percent (%) are recycled. All HP LaserJet Toner Cartridges are shipped in recycled boxes with the entire box being recyclable through the returns program. Styrofoam end caps, which were used to support HP LaserJet Toner Cartridges during shipping, have been replaced with molded end caps made from 100% post-consumer paper products. For more information in the U.S., call (1) (800) 340-2445 or visit the HP LaserJet website at http://www.ljsupplies.com/planetpartners. International customers can call the local HP Sales and Service Office for further information regarding the HP Toner Cartridge Recycling Program.

- **Printer and parts**—Design for recycling has been incorporated into this printer and its accessories. The number of materials has been kept to a minimum while ensuring proper functionality and high product reliability. Dissimilar materials have been designed to separate easily. Fasteners and other connections are easy to locate, access, and remove with common tools. High priority parts have been designed to be accessed quickly for efficient

disassembly and repair. Plastic parts have been primarily designed in two colors to enhance recycling options. A few small parts are colored specifically to highlight customer access points.

HP provides a product return system for customers in Germany. Many of the functional parts are recovered, tested, and reused as fully-warranted service parts. Used parts are not placed into new product manufacturing. The remainder of the product parts are recycled, if possible. For product return information, call (49) (070) 3114-1936 or Fax (49) (070) 3114-4195.

- **Paper**—This printer is suited for the use of recycled papers when the paper meets the guidelines outlined in the *HP LaserJet Printer Family Paper Specification Guide*. This printer is suited for the use of recycled paper according to DIN 19 309.

  The online user guide is provided on compact disc, which allows the same high-quality information to be provided without consuming the large quantities of energy and natural resources required to produce traditional paper manuals.

To ensure the longevity of your HP LaserJet printer, HP provides the following:

- **Extended warranty**—HP SupportPack provides coverage for the HP hardware product and all HP-supplied internal components. The hardware maintenance covers a 3-year period from date of the HP product purchase. HP SupportPack must be purchased by the customer within 90 days of the HP product purchase. Information on HP SupportPack is available in a fax format by calling the U.S. HP FIRST (Fax Information Retrieval Support Technology) at (1) (800) 333-1917. The document number is 9036. Non-U.S. customers can contact the nearest HP-dealer about this service.
- **Spare parts and consumables availability**—Spare parts and consumable supplies for this product will be made available for at least 5 years after production has stopped.

Regulatory statements

FCC regulations

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy. If it is not installed and used in accordance with the instructions, it may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase separation between equipment and receiver.
- Connect equipment to an outlet on a circuit different from that to which the receiver is located.
- Consult your dealer or an experienced radio/TV technician.

Note Any changes or modifications to the printer that are not expressly approved by HP could void the user's authority to operate this equipment.

Use of a shielded interface cable is required to comply with the Class B limits of Part 15 of FCC rules.

Canadian DOC regulations

Complies with Canadian EMC Class B requirements.

« Conforme à la classe B des normes canadiennes de compatibilité électromagnétiques « CEM ». »

VCCI statement (Japan)

この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に基づく第二種情報技術装置です。この装置は、家庭環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。
取り扱い説明書に従って正しい取り扱いをして下さい。

Korean EMI statement

사용자 안내문 (B급 기기)

이 기기는 비업무용으로 전자파장해검정을 받은 기기로서, 주거지역에서는 물론 모든 지역에서 사용할 수 있습니다.

Declaration of Conformity

according to ISO/IEC Guide 22 and EN 45014

Manufacturer's Name:	Hewlett-Packard Company
Manufacturer's Address:	11311 Chinden Boulevard Boise, Idaho 83714-1021 USA
declares that the product	
Product Name:	HP Color LaserJet 4500, 4500 N, 4500 DN
Model Number:	C4084A, C4089A, C4094A
Product Options:	ALL

conforms to the following Product Specifications:

Safety: IEC 950:1991+A1+A2+A3+A4 / EN 60950:1992+A1+A2+A3+A4
IEC 825-1:1993+A11 / EN 60825-1:1994+A11 Class 1 (Laser/LED)

EMC: CISPR 22:1993+A1 / EN 55022:1994 Class B[1]
EN 50082-1:1992

IEC 801-2:1991 / prEN 55024-2:1992 -	4 kV CD, 8 kV AD
IEC 801-3:1984 / prEN 55024-3:1991 -	3 V/m
IEC 801-4:1988 / prEN 55024-4:1992 -	0.5kV Signal Lines, 1.0kV Power Lines

IEC 1000-3-2:1995 / EN61000-3-2:1995
IEC 1000-3-3:1994 / EN61000-3-3:1995

FCC Title 47 CFR, Part 15 Class B2 / ICES-003, Issue 2 / VCCI-2[1]
AS / NZS 3548:1992 / CISPR 22:1993 Class B[1])

Supplementary Information:

The product herewith complies with the requirements of the following Directives and carries the CE-marking accordingly:
– the EMC Directive 89/336/EEC
– the Low Voltage Directive 73/23/EEC

[1] The product was tested in a typical configuration with Hewlett-Packard Personal Computer Systems.
[2] This Device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
*This printer contains Local Area Network (LAN) options. When the interface cable is attached to either of the IEEE 802.3 connectors, the printer meets the requirements of EN 55022A Class A.
February 9, 1998

For Compliance Information ONLY, contact:

Australia Contact: Product Regulations Manager, Hewlett-Packard Australia Ltd., 31.41 Joseph Street, Blackburn, Victoria 3130, Australia.

European Contact: Your local Hewlett-Packard Sales and Service Office or Hewlett-Packard GmbH, Department HQ-TRE / Standards Europe, Herrenberger Strasse 130, D-71034 Böblingen, Germany (FAX: 49-7031-14-3143).

USA Contact: Product Regulations Manager, Hewlett-Packard Company, P.O. Box 15, Mail Stop 160, Boise, ID 83707-0015 (Phone: 208-396-6000).

Safety information

Laser safety statement

The Center for Devices and Radiological Health (CDRH) of the U.S. Food and Drug Administration has implemented regulations for laser products manufactured since August 1, 1976. Compliance is mandatory for products marketed in the United States. The printer is certified as a “Class 1” laser product under the U.S. Department of Health and Human Services (DHHS) Radiation Performance Standard according to the Radiation Control for Health and Safety Act of 1968. Since radiation emitted inside the printer is completely confined within protective housings and external covers, the laser beam cannot escape during any phase of normal user operation.

Material Safety Data Sheet

The Toner Cartridge/Drum Material Safety Data Sheet (MSDS) can be obtained by calling the U.S. HP FIRST at (800) 231-9300, or by visiting the website at http://www.ljsupplies.com/planetpartners/datasheets.html. International customers should see support information in this guide for appropriate phone numbers and information

Hint To get documents from HP FIRST by fax, use a group 3 (touch tone) fax machine.

Toner safety

Hewlett-Packard encourages responsible disposal of HP LaserJet printer consumable items through its Environmental Collection Program. For details on this program, see the recycling instruction guide enclosed with each consumable item.

Note In case of toner spills, skin and clothing are best cleaned by removing as much toner as possible with a dry tissue, then washing with cold water. Hot water causes toner to permanently set into clothing.

Laser Statement for Finland

LASERTURVALLISUUS

Luokan 1 laserlaite

Klass 1 Laser Apparat

HP LaserJet 4500 -laserkirjoitin on käyttäjän kannalta turvallinen luokan 1 laserlaite. Normaalissa käytössä kirjoittimen suojakotelointi estää lasersäteen pääsyn laitteen ulkopuolelle.

Laitteen turvallisuusluokka on määritetty standardin EN 60825-1 (1994) mukaisesti.

VAROITUS !

Laitteen käyttäminen muulla kuin käyttöohjeessa mainitulla tavalla saattaa altistaa käyttäjän turvallisuusluokan 1 ylittävälle näkymättömälle lasersäteilylle.

VARNING !

Om apparaten används på annat sätt än i bruksanvisning specificerats, kan användaren utsättas för osynlig laserstrålning, som överskrider gränsen för laserklass 1.

HUOLTO

HP LaserJet 4500 -kirjoittimen sisällä ei ole käyttäjän huollettavissa olevia kohteita. Laitteen saa avata ja huoltaa ainoastaan sen huoltamiseen koulutettu henkilö. Tällaiseksi huoltotoimenpiteeksi ei katsota väriainekasetin vaihtamista, paperiradan puhdistusta tai muita käyttäjän käsikirjassa lueteltuja, käyttäjän tehtäväksi tarkoitettuja ylläpitotoimia, jotka voidaan suorittaa ilman erikoistyökaluja.

VARO !

Mikäli kirjoittimen suojakotelo avataan, olet alttiina näkymättömälle lasersäteilylle laitteen ollessa toiminnassa. Älä katso säteeseen.

VARNING !

Om laserprinterns skyddshölje öppnas då apparaten är i funktion, utsättas användaren för osynlig laserstrålning. Betrakta ej strålen.

Tiedot laitteessa käytettävän laserdiodin säteilyominaisuuksista:

Aallonpituus 770-795 nm

Teho 5 mW

Luokan 3B laser

2 Service approach

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Overview

This chapter covers the topics listed below. It also includes several tables to facilitate access to HP support centers.

- Service approach
- Parts and supplies
- Technical assistance
- HP support and services
- Warranty statement
- HP maintenance agreements

Service approach

Repair of the printer normally begins with use of the printer's internal diagnostics and the three-step process below:

Step 1 Isolate the problem to the major system (for example, the host computer, the network and/or server, or the printer system).

Step 2 Determine if the problem is located in the accessories or in the printer engine.

Step 3 Troubleshoot the problem using the procedures in Chapter 7.

Once a faulty part is located, repair is usually accomplished by assembly level replacement of field replaceable units (FRUs). Some mechanical assemblies may be repaired at the subassembly level. Hewlett-Packard does not support replacement of components on the printed circuit assembles.

Parts and supplies

Ordering parts

Field replaceable and accessory part numbers are found in Chapter 8 of this manual. Replacement parts may be ordered from HP's Service Materials Organization (SMO) or Support Materials Europe (SME).

By phone:

- Service Materials Organization (SMO)
  (1)(800) 227-8164 (US only)
- Support Materials Europe (SME) (49-7031) 14-2253

By mail:

Hewlett-Packard Company
Support Materials Organization
8050 Foothills Blvd.
Roseville, CA 95678

Hewlett-Packard Company
Support Materials Europe
Wolf-Hirth Strasse 33
D-7030 Böblingen, German

Note Use only accessories specifically designed for this printer.

Spare parts and consumable supplies for this product will be made available for at least 5 years after production has stopped.

Ordering consumables

Consumables may be ordered directly from Hewlett-Packard. The phone numbers for ordering consumables are:

- U.S. (1)(800) 538-8787
- Canada (1)(800) 387-3154 (Toronto (1)(416) 671-8383
- United Kingdom 0734-441212
- Other local phone numbers may also be available

Ordering field replaceable units

The HP Color LaserJet 4500 printer is designed to be repaired by replacing field replaceable units (FRUs). Part numbers are located in Chapter 8 and can be ordered from SMO or SME.

Exchange and recycling program

HP offers remanufactured assemblies for some selected parts. These are identified in Chapter 8 and can be ordered through SMO or SME.

- **Printer and Parts**—Design for recycling has been incorporated into this printer and its accessories. The number of materials has been kept to a minimum while ensuring proper functionality and high product reliability. Dissimilar materials have been designed to separate easily. Fasteners and other connections are easy to locate, access, and remove with common tools. High-priority parts have been designed to be accessed quickly for efficient disassembly and repair. Plastic parts have been primarily designed in two colors to enhance recycling options. A few small parts are colored specifically to highlight customer access points.

  HP provides a product return system for customers in Germany. Many of the functional parts are recovered, tested, and reused as fully-warranted service parts. Used parts are not placed into new product manufacturing. The remainder of the product parts are recycled, if possible. For product return information, call

- **Paper**—This printer is suited for the use of recycled papers when the paper meets the guidelines outlined in the *HP LaserJet Printer Family Paper Specification Guide*. This printer is suited for the use of recycled paper according to DIN 19 309. The online user guide is provided on compact disc, which allows the same high-quality information to be provided without consuming the large quantities of energy and natural resources required to produce traditional paper manuals.

Ordering related documentation and software

Table 2-1 shows where to order related documentation and software. Telephone numbers for the various sources are:

- SMO (1) (800) 227-8164 (U.S. only)
- SME (49 7031) 14-2253
- HPD (HP Distribution Center) (1) (805) 257-5565. Fax: (1) (805) 257-6995

Table 2-1 Related documentation and software

Description	Part Number	SMO	SME	HPD
HP LaserJet Printer Family Paper Specification Guide	5010-6394			X
HP Peripherals Connectivity Solutions Guide	5091-6453E	X	X	
HP JetDirect Print Server Software Installation Guide	J2552-90101	X	X	
Technical reference package	5021-0377	X		
HP Color LaserJet Printer Drivers Disk	C4084-60104			
HP Color LaserJet 4500, 4500 N documentation bundle (quick reference guide and getting started guide)	C4084-99001	X		
HP Color LaserJet 4500 DN documentation bundle (quick reference guide and getting started guide)	C4094-99001	X		
HP Color LaserJet Family Quick Reference Service Guide	5040-9071	X		
CD-ROM service	C4084-60110	X	X	
Online user guide	C4084-90937	X		

Technical assistance

HP FIRST

HP FIRST (Fax Information Retrieval Support Technology) is a phone-in fax service providing technical information for HP LaserJet users as well as service personnel. Receiving a fax requires a type 3 facsimile machine or fax card. Service related information includes:

- Service notes (HP authorized dealers)
- Application notes
- Product data sheets
- Material Safety Data Sheets (MSDS)
- Typeface and accessory information
- Printer support software information
- Toner information
- Driver request form and software matrix

Hint See Table 2-2 to find the HP FIRST fax number for your area.

Table 2-2 HP FIRST fax numbers

HP FIRST: HP FIRST Fax will deliver detailed troubleshooting information on common software and troubleshooting tips for your HP product. Call from any touch tone phone and request up to three documents per call. These documents will be sent to the fax of your choice.

Australia	+61 (0) 3 9272 2627	Korea	+82 (0) 02 769 0543
Austria	0660-8218	Malaysia	+60 (0) 3 298 2478
Belgium (Dutch)	0800 1 1906	Netherlands	0800-0222420
Belgium (French)	0800 1 7043	New Zealand	+64 (0) 09 356 6642
Canada	1-800-333-1917	Norway	800-11319
China	+86 (0) 10 6505 5280	Portugal	05 05 313342
Denmark	800-10453	Philippines	+65 275 7251
English (outside of U.K.)	+31 20 681 5792	Singapore	+65 275 7251
Finland	800-13134	Spain	900-993123
France	0800-905900	Sweden	020-79-5743
Germany	0130-810061	Switzerland (German)	0800-551527
Hong Kong	852-2506-2422	Switzerland (French)	0800-551526
Hungary	(36) (1) 252-4647	Taiwan	(886) (2) 719-5589
India	+91 (0) 11 682 6031	Thailand	+66 (0) 2 661 3511
Indonesia	+62 (0) 21 352 2044	United Kingdom	0800-960271
Italy	1678-59020	United States	(1) (800) 333-1917
Japan	+81 (0) 3 3335 8622		

HP support and services

Use tables 2-3 through 2-5 to find printer support and services in your area.

Table 2-3 HP support

Online services: for 24-hour access to information over your modem, we suggest these services:	**World Wide Web URL**—Printer drivers, updated HP printer software, plus product and support information may be obtained from the following URLs**:** in the U.S. http://www.hp.com in Europe http://www2.hp.com Printer drivers may be obtained from the following sites: in Japan ftp://www.jpn.hp.com/drivers/ in Korea http://www.hp.co.kr in Taiwan http://www.hp.com.tw or the local driver website http://www.dds.com.tw	
	America Online America Online/Bertelsmann is available in the U.S.,France, Germany, and U.K.—Printer drivers, updated HP printer software, and support documentation to help answer your questions about HP products are available. Use Keyword HP to start your tour or call 1-800-827-6364 preferred customer # 1118 to subscribe. In Europe, call the appropriate number below: Austria 0222 58 58 485 France ++353 1 704 90 00 Germany 0180 531 31 64 Switzerland 0848 80 10 11 United Kingdom 0800 279 1234	
	CompuServe—Printer drivers, updated HP printer software, and interactive sharing of technical information with other members are available on CompuServe's "HP User's forums" (GO HP), or call (1) (800) 524-3388 and ask for representative #51 to subscribe. (CompuServe is also available in the U.K., France, Belgium, Switzerland, Germany, and Austria.)	
Obtaining software utilities and electronic information for U.S. and Canada:	**Phone:** (1) (805) 257-5565 **Fax:** (1) (805) 257-6995	**Mail:** Hewlett-Packard Co. P.O. Box 907 Santa Clarita, CA 91380-9007 U.S.A.
For Asia-Pacific countries:	Contact Mentor Media at (65) 740-4477 (Hong Kong, Indonesia, Philippines, Malaysia, or Singapore). For Korea, call (82) (2) 3270-0805 or (82) (2) 3270-0893.	
For Australia, New Zealand, and India:	For Australia and New Zealand, call (61) (2) 565-6099. For India, call (91) (11) 682-6035.	
For European English:	For U.K., call (44) (142) 986-5511. For Ireland and outside U.K., call (44) (142) 986-5511.	

Table 2-3 HP support (continued)

HP direct ordering for accessories or supplies:	Call (1) (800) 538-8787 (U.S.) or (1) (800) 387-3154 (Canada).
HP Support Assistant compact disc:	This support tool offers a comprehensive online information system designed to provide technical and product information on HP products. To subscribe to this quarterly service in the U.S. or Canada, call (1) (800) 457-1762. In Hong Kong, Indonesia, Malaysia, or Singapore, call Mentor Media at (65) 740-4477.
HP service information:	To locate HP-authorized dealers, call (1) (800) 243-9816 (U.S.) or (1) (800) 387-3867 (Canada)
HP service agreements:	Call (1) (800) 835-4747 (U.S.) or (1) (800) 268-1221 (Canada). Extended Service (1) (800) 446-0522

Table 2-4 HP driver distribution center

To obtain printer drivers and software:	U.S.	(1) (805) 257-5565
	Hong Kong, Indonesia, Philippines, Malaysia, and Singapore	(65) 740-4477
	Korea	(82) (2) 3270-0893 or (82) (2) 3270-0893
	Australia and New Zealand	(61) (2) 565-6099
	India	(91) (11) 682-6035
	U.K.	(44) (142) 986-5511
	Ireland and outside the U.K.	(44) (142) 986-5511
Printer drivers may be obtained from the following websites:	HP local driver website	http://www.dds.com.tw
	Japan	ftp://www.jpn.hp.com/drivers/
	Korea	http://www.hp.co.kr
	Taiwan	http://www.hp.com.tw

Table 2-5 Customer support worldwide

Customer support and product repair assistance for the U.S. and Canada:	Call (1) (208) 323-2551 Monday through Friday from 6 am to 6pm (Mountain Time), free of charge during the warranty period. However, your standard long-distance phone charges still apply. Have your system nearby and your serial number ready when calling. If you know your printer needs to be repaired, call (1) (800) 243-9816 to locate your nearest HP-authorized service provider, or call (1) (208) 223-2551 for HP centralized service dispatch. Post-warranty telephone assistance is available to answer your product questions. Call (1) (900) 555-1500 ($2.50* per minute, U.S. only) or call (1) (800) 999-1148 ($25* per call, Visa or MasterCard, U.S. and Canada) Monday through Friday from 7 am to 6 pm and Saturday from 9 am to 3 pm (Mountain Time). *Charges begin only when you connect with a support technician. *Prices subject to change.*

European customer support center language and in-country options available

Open Monday through Friday 8:30 to 18:00 CET

HP provides a free telephone support service during the warranty period. By calling a telephone number listed below, you will be connected to a responsive team waiting to help you. If you require support after your warranty has expired, you can receive support for a fee through the same telephone number. The fee is charged on a per-incident basis. When calling HP, have the following information ready: product name and serial number, date of purchase, and description of the problem.

English	Ireland:	(353) (1) 662-5525	**German**	Germany:	(49) (180) 525-8143
	U.K.:	(44) (171) 512-5202		Austria:	(43) (1) 0660-6386
	International:	(44) (171) 512-5202	**Norwegian**	Norway:	(47) 2211-6299
Dutch	Belgium:	(32) (2) 626-8806	**Danish**	Denmark:	(45) 3929-4099
	Netherlands:	(31) (20) 606-8751	**Finnish**	Finland:	(358) (9) 0203-47288
French	France:	(33) (01) 43-62-3434	**Swedish**	Sweden:	(46) (8) 619-2170
	Belgium:	(32) (2) 626-8807	**Italian**	Italy:	(39) (2) 264-10350
	Switzerland:	(41) (84) 880-1111	**Spanish**	Spain:	(34) (90) 232-1123
			Portuguese	Portugal:	(351) (1) 441-7199

Table 2.5 Customer support worldwide (continued)

In-country support numbers: If you require support after your warranty has expired, additional product repair services, or if your country is not listed below, see “Worldwide Sales and Service Offices.”			
Argentina	787-8080	Japan	(81) (3) 3335-8333
Australia	(61) (3) 272-8000	Malaysia	(60) (3) 295-2566
Brazil	022-829-6612	Mexico (Mexico City)	01 800-22147
Canada	(1) (208) 323-2551	Mexico (outside Mexico City)	01 800-90529
China	(86) (10) 65053888-5959	New Zealand	(64) (9) 356-6640
Chile	800-360999	Philippines	(63) (2) 894-1451
Czech Republic	(420) (2) 471-7321	Poland	(48) (22) 37-5065
Greece	(30) (1) 689-6411	Portugal	(351) (1) 301-7330
Hong Kong	(852) 800-96-7729	Russia	(7) (95) 923-5001
Hungary	(36) (1) 343-0310	Singapore	(65) 272-5300
India	(91) (11) 682-6035	Taiwan	(886) (02) 717-0055
	(91) (11) 682-6069	Thailand	+66 (0) 2 661-4011
Indonesia	(62) (21) 350-3408	Turkey	(90) (1) 224-5925
Korea	(82) (2) 3270-0700		
Korea (outside Seoul)	(82) (080) 999-0700		

Dealer response line

For further technical assistance on pre- and post-sales and service support, HP dealer service-authorized personnel may contact the Dealer Response Line:

(1) (800) 544-9976 U.S. only
(1) (800) 363-6594 Canada

HP Direct

HP Color LaserJet 4500, 4500 N, and 4500 DN printer accessories and supplies may be ordered by calling one of the following HP Direct numbers:

(1) (800) 538-8787 U.S.
(1) (800) 387-8164 Canada

Parts identification

(Service part number identification)
(1) (916) 783-0804

Worldwide sales and service offices

See the online user guide for a complete listing for the worldwide sales and service address and telephone numbers.

Warranty statement

Hewlett-Packard warranty statement

HP Color LaserJet 4500, 4500 N, 4500 DN Printer	One-year limited warranty

1 HP warrants HP hardware, accessories and supplies against defects in materials and workmanship for the period specified above. If HP receives notice of such defects during the warranty period, HP will, at its option, either repair or replace products which prove to be defective. Replacement products may be either new or like-new.

2 HP warrants that HP software will not fail to execute its programming instructions, for the period specified above, due to defects in material and workmanship when properly installed and used. If HP receives notice of such defects during the warranty period, HP will replace software media which does not execute its programming instructions due to such defects.

3 HP does not warrant that the operation of HP products will be uninterrupted or error free. If HP is unable, within a reasonable time, to repair or replace any product to a condition as warranted, customer will be entitled to a refund of the purchase price upon prompt return of the product.

4 HP products may contain remanufactured parts equivalent to new in performance or may have been subject to incidental use.

5 The warranty period begins on the date of delivery or on the date of installation if installed by HP. If customer schedules or delays HP installation more than 30 days after delivery, warranty begins on the 31st day from delivery.

6 Warranty does not apply to defects resulting from (a) improper or inadequate maintenance or calibration, (b) software, interfacing, parts or supplies not supplied by HP, (c) unauthorized modification or misuse, (d) operation outside of the published environmental specifications for the product, or (e) improper site preparation or maintenance.

7 TO THE EXTENT ALLOWED BY LOCAL LAW, THE ABOVE WARRANTIES ARE EXCLUSIVE AND NO OTHER WARRANTY OR CONDITION, WHETHER WRITTEN OR ORAL, IS EXPRESSED OR IMPLIED AND HP SPECIFICALLY DISCLAIMS THE IMPLIED WARRANTIES OR CONDITIONS OF MERCHANTABILITY, SATISFACTORY QUALITY, AND FITNESS FOR A PARTICULAR PURPOSE.

8 HP will be liable for damage to tangible property per incident up to the greater of $300,000 or the actual amount paid for the product that is the subject of the claim, and for damages for bodily injury or death, to the extent that all such damages are determined by a court of competent jurisdiction to have been directly caused by a defective HP product.

9 TO THE EXTENT ALLOWED BY LOCAL LAW, THE REMEDIES IN THIS WARRANTY STATEMENT ARE CUSTOMER'S SOLE AND EXCLUSIVE REMEDIES. EXCEPT AS INDICATED ABOVE, IN NO EVENT WILL HP OR ITS SUPPLIERS BE LIABLE FOR LOSS OF DATA OR FOR DIRECT, SPECIAL, INCIDENTAL, CONSEQUENTIAL (INCLUDING LOST PROFIT OR DATA), OR OTHER DAMAGE, WHETHER BASED IN CONTRACT, TORT, OR OTHERWISE.

10 FOR CONSUMER TRANSACTIONS IN AUSTRALIA AND NEW ZEALAND: THE WARRANTY TERMS CONTAINED IN THIS STATEMENT, EXCEPT TO THE EXTENT LAWFULLY PERMITTED, DO NOT EXCLUDE, RESTRICT OR MODIFY AND ARE IN ADDITION TO THE MANDATORY STATUTORY RIGHTS APPLICABLE TO THE SALE OF THIS PRODUCT TO YOU.

To ensure longevity of your HP LaserJet printer, HP provides the following:

Extended warranty

HP SupportPack provides coverage for the HP hardware product and all HP-supplied internal components. The hardware maintenance covers a three-year period from date of the HP product purchase. The customer must purchase HP SupportPack within 90 days of the HP product purchase. Information on HP SupportPack is available in a fax format by calling the U.S. HP FIRST at (1) (800) 333-1917.

HP maintenance agreements

HP has several types of maintenance agreements that meet a wide range of support needs as described below:

- **Priority on-site service** is designed for production-critical applications. This service agreement provides the customer with a four-hour service response to their site for calls made during normal HP business hours.
- **Next day on-site service** provides on-site support by the next working day following the service request. Extended coverage hours and extended travel beyond HP designated service zones are available for additional charges on most on-site service agreements.
- **Weekly (volume) on-site service agreement** (for organizations with multiple HP LaserJet printers) provides economical, scheduled, on-site coverage for sites using 25 or more workstation products. The service provides scheduled weekly repair visits to the customer's central location. HP can write an agreement for any combination of 25 or more workstation products including printers, plotters, computers, and disk drives.

3 Installation and configuration

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Overview

This chapter discusses the following topics:

- Unpacking the printer
- Installation
- Enhanced I/O (EIO) configuration
- Printer drivers
- Network configuration
- Configuration tips
- Setting network security on the printer

Unpack the printer

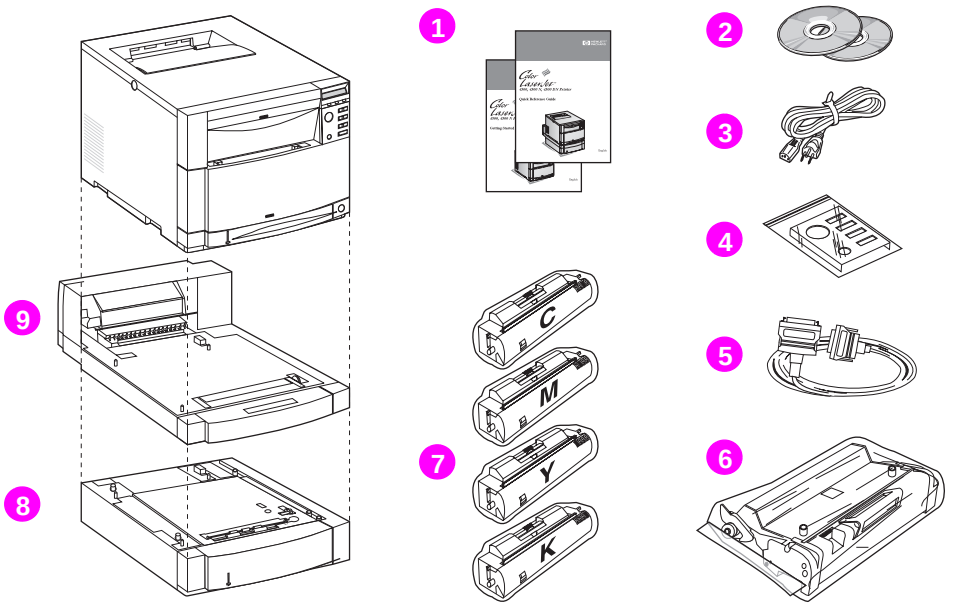


Figure 3-1 **Package contents**

Package contents

The following items are included with the printer:

1 Printer guides: getting started guide and quick reference guide

2 Software CD-ROMs (including printer drivers and software, network administrator utilities, and the online user guide)

3 Power cord

4 Control panel overlay (for non-English language users)

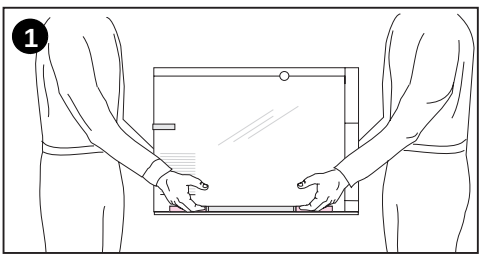
5 Parallel cable (not included with the HP Color LaserJet 4500 N and 4500 DN printer)

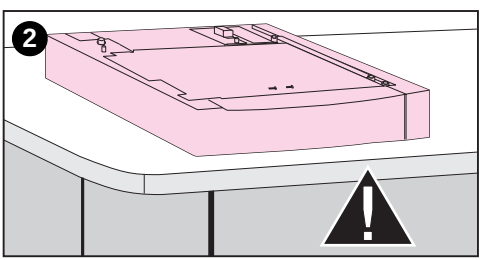
6 Imaging drum

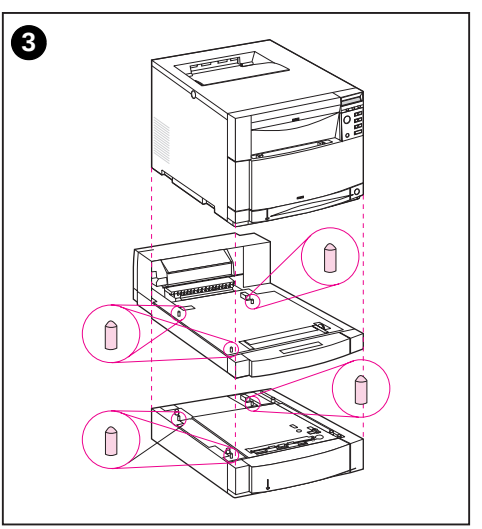
7 Four toner cartridges: cyan (C), magenta (M), yellow (Y), and black (K)

8 Tray 3 (500-sheet paper feeder, included only with the HP Color LaserJet 4500 DN printer)

9 Duplex printing accessory (included only with the HP Color LaserJet 4500 DN printer)







Unpacking the printer

Note
Save all of the packing materials in case you need to repack and transport the printer at a later date.

WARNING!
The 4500 and 4500 N printers weigh approximately 57 kg (112 lb), and the 4500 DN printer weighs approximately 77 kg (169 lb) with Tray 3 and the duplex printing accessory installed. HP recommends having two or more people lift or move any of the printers.

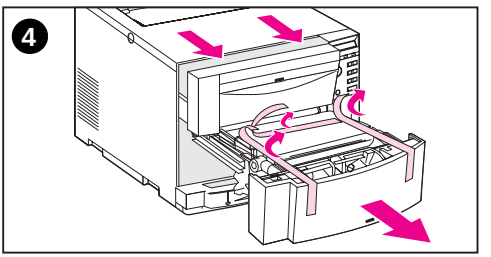
1 Using safe lifting techniques, remove the printer and the printer accessories from the box.

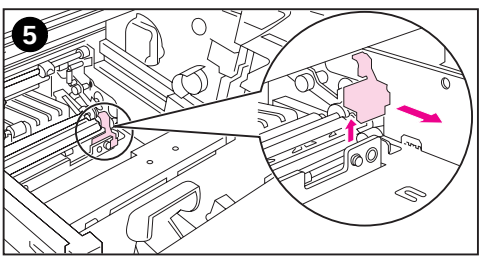
CAUTION
The prepared location must be level (not more than a 2° angle), able to support up to 77 kg (169 lb), and must support all four corners of the 500-sheet paper feeder (serves as printer base).

2 Place the 500-sheet feeder in the prepared location.

CAUTION
Avoid bending the guide pins while assembling the printer.

3 Using the guide pins for proper alignment, carefully assemble the printer and accessories.



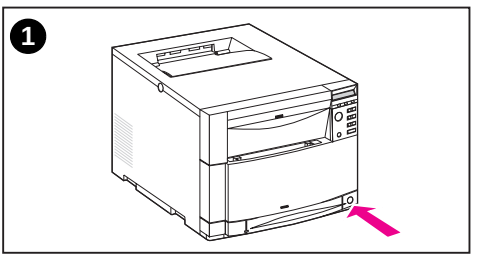


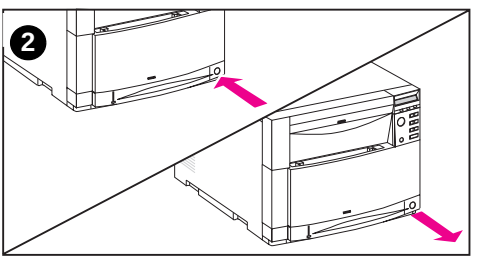
4 Open the middle front drawer and remove the packing tape, then open the front upper drawer.

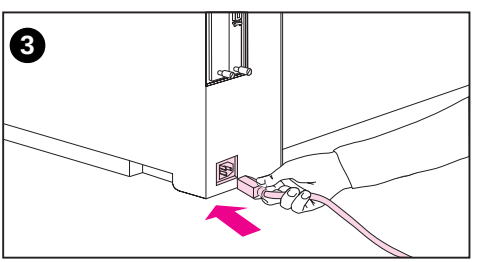
5 With both the middle front drawer and the front upper drawer open, locate the orange spacer on the transfer roller. Pull up on the orange spacer to remove it. Then close both drawers.

CAUTION

Be sure to remove the orange spacer. If it is not removed, it will damage the printer, which will require a service call for repair.

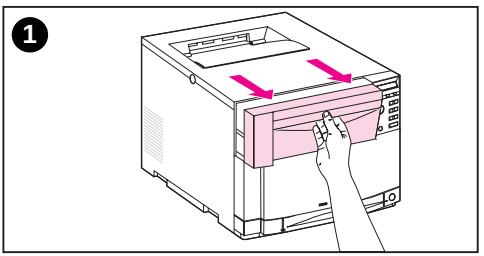


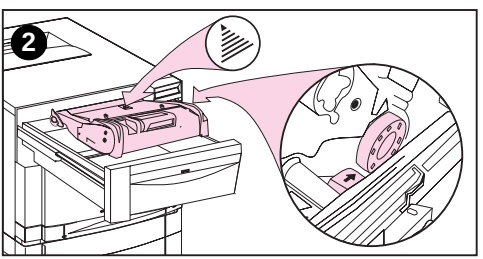


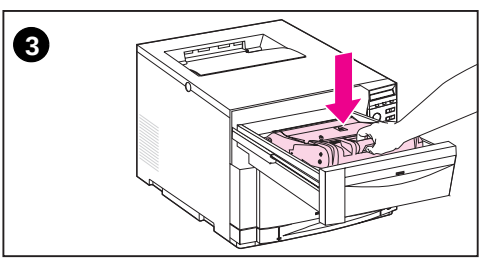


Attaching the power cord

1. Locate the standby button (power switch) on the front of the printer.
2. The standby button has two positions: in (power on) and out (standby mode—the fans remain on). Make sure that the standby button is out (standby mode).
3. Locate the power cord on the back side of the printer for the HP Color LaserJet 4500 or 4500 N printers or the duplex printing accessory for the HP Color LaserJet 4500 DN printer. Connect the power cord to the power receptacle on the back of the printer.



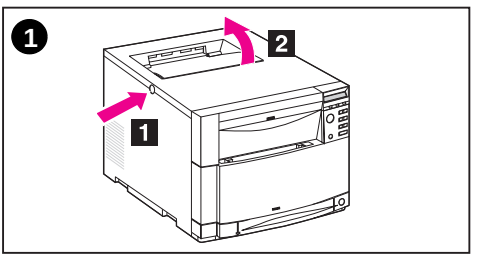


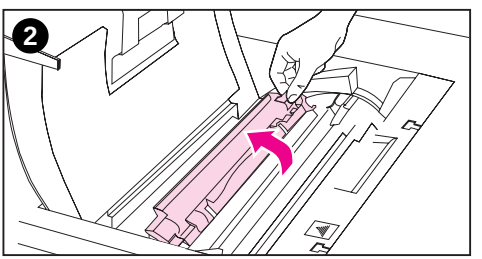


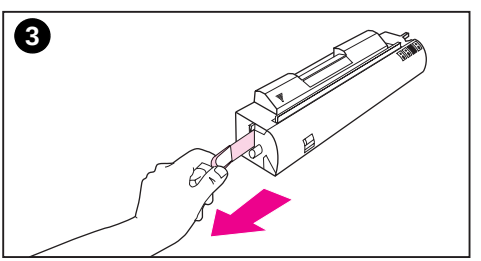
Installing the imaging drum

1. Open the upper front drawer of the printer.
2. Align the imaging drum over the drawer so that the arrow on top points to the rear of the printer, and the blue end cap on the side slides into the slot identified with the blue arrow.
3. Slide the imaging drum down into place.

CAUTION
If you need to ship the printer, remove the toner cartridges and imaging drum before shipping.







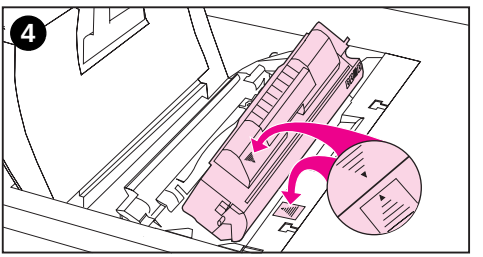
Installing the toner cartridge

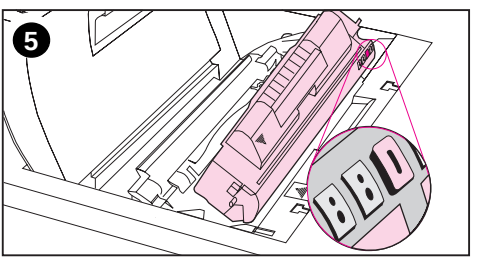
1 With the printer turned on and warmed up, push the dark gray release button on the side of the printer ([1]) and open the printer's top cover ([2]).

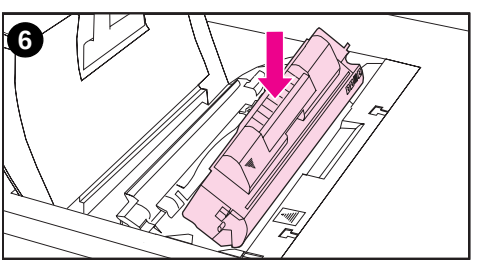
2 Lift the flap that covers the toner cartridge slot.

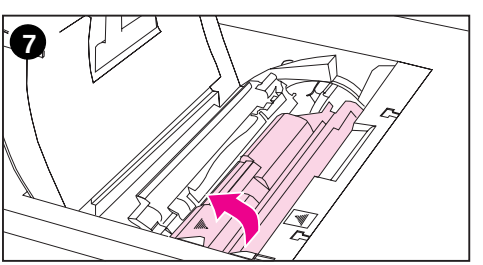
CAUTION
Do not shake the toner cartridges after removing them.

3 Firmly pull the orange tab located on the end of the toner cartridge to remove the inside sealing tape. (If the tab breaks off, pull on the tape.)









4 Position the toner cartridge over the cartridge slot so that the blue arrow on the toner cartridge points to the blue arrow on the printer.

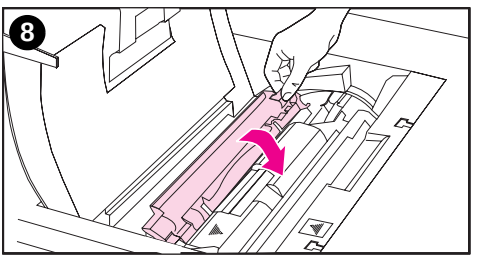
5 Make sure that the tab on the other end of the toner cartridge aligns with the notch on the cartridge slot.

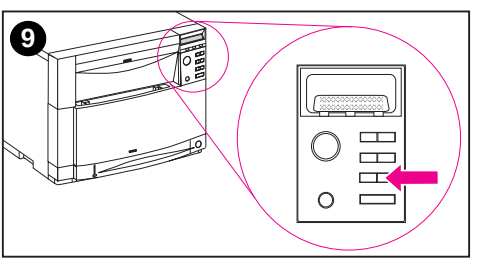
Note

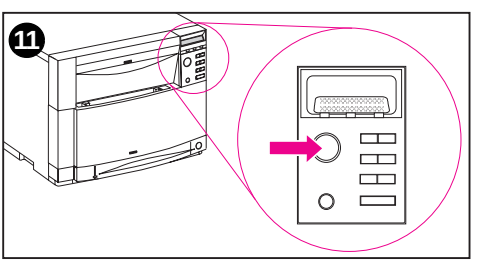
If the tab does not fit in the notch when you insert the toner cartridge, the toner is the wrong color for that cartridge slot.

6 Slide the toner cartridge down into the slot until the cartridge stops.

7 Rotate the toner cartridge toward the back of the printer (within the cartridge slot) until the cartridge stops. The cartridge shutter opens to reveal the developer sleeve.







8 Lower the flap that covers the toner cartridge and close the printer's top cover.

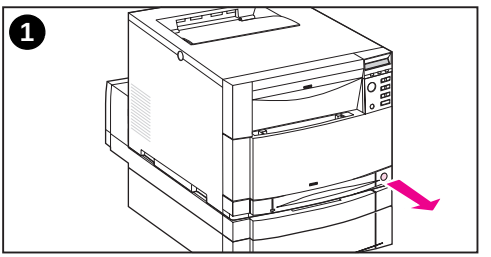
Note
You must close the top cover before installing another toner cartridge.

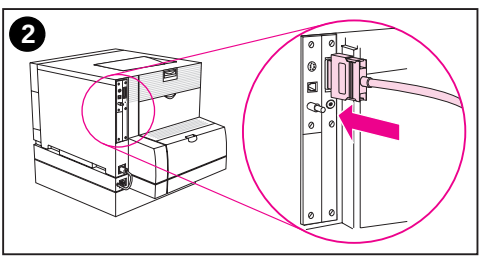
9 On the printer control panel, press [Value +] once to prepare the printer for installation of another toner cartridge. When the printer is ready, the control panel displays:
`TONER POSITION`
(color) `= MISSING`

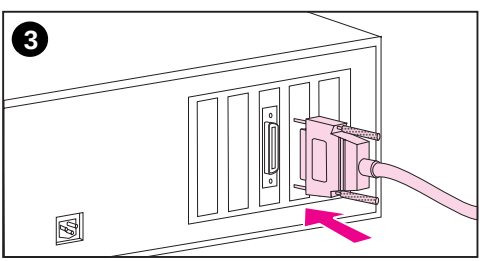
10 Repeat steps 1-9 for each cartridge.

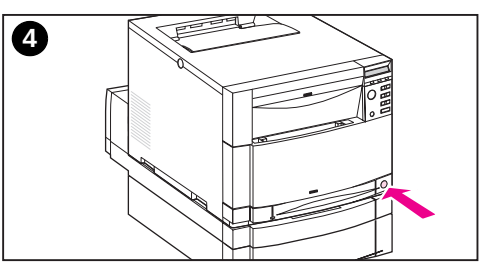
11 After installing all four toner cartridges, close the printer's top cover and press [Go]. Wait while the printer runs an internal color calibration. The calibration takes a few minutes. When the printer is ready, the control panel displays:
`READY`.

CAUTION
If you need to ship the printer, remove the toner cartridges and imaging drum before shipping.









Connecting the parallel cable

The printer connects to the computer with a bidirectional parallel cable (IEEE-1284-C compliant). Connect the male “C” connector to the printer and the male “B” connector to the computer. HP recommends that the parallel cable length be no longer than 10 meters (30 ft) in length. The cable (HP part number C2946A) is included with the HP Color LaserJet 4500 printer. It must be purchased separately for the HP Color LaserJet 4500 N and DN printers.

To connect a parallel cable:

1. Press the printer standby button (power switch) to place the printer in standby mode. Turn off the computer.
2. Plug the parallel cable into the printer’s parallel port.
3. Plug the other end of the parallel cable into the computer. Tighten the screws on the parallel cable to secure the cable to the computer.
4. Turn the computer on and then turn the printer on.

Note

Your system will sense the printer (if your system is Plug and Play compatible). Follow the directions on your screen. To install the complete software package, cancel Plug and Play.

Parallel configuration

Parallel interface

If your printer is not configured with a network interface card, connect the printer to your computer using a bidirectional parallel cable (IEEE-1284C compliant) with a “C” connector (see Figure) plugged into the printer’s parallel port. The cable can be a maximum of 10 meters (30 feet).

When used to describe a parallel interface, the term *bidirectional* indicates that the printer is able to both receive data from the computer and to send data to the computer through the parallel port.

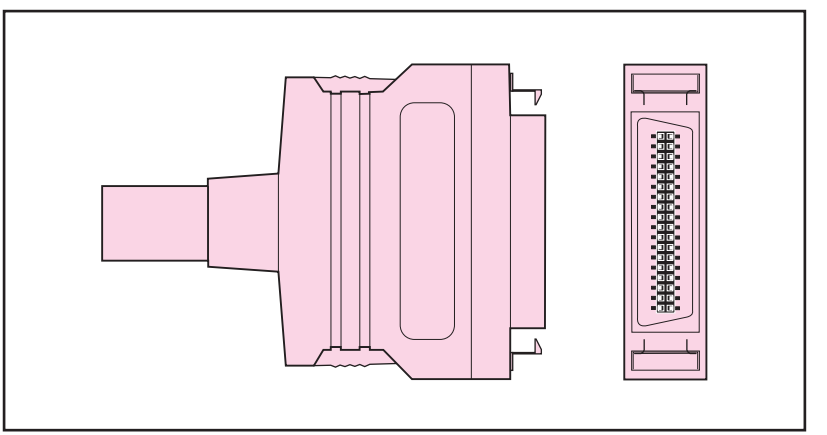


Figure 3-2 **Parallel cable with a “C” Connector**

Note

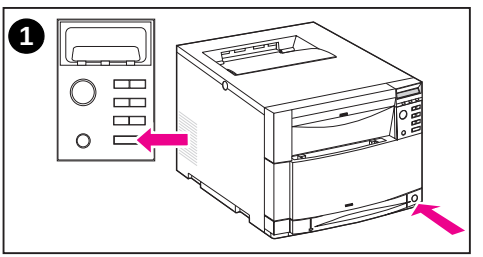
To use the enhanced capabilities of the bidirectional parallel interface such as bidirectional communication between the computer and printer, faster transfer of data, and automatic configuration of printer drivers, your software application must support these capabilities.

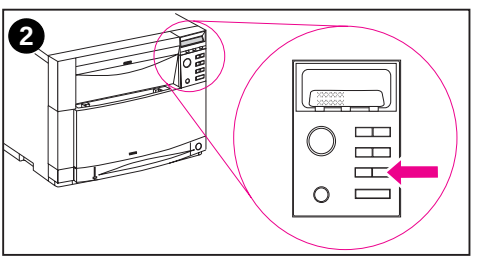
When you are using multiple ports, you can adjust automatic I/O switching to maximize performance by using the timeout feature. If data from other ports appears in the middle of your print job, increase the I/O Timeout value.

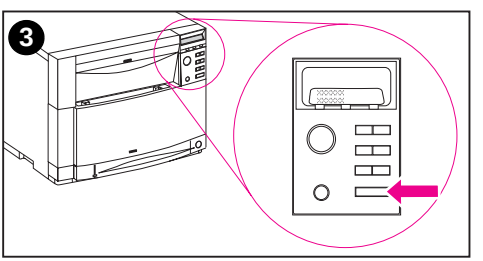
Parallel cable pin configuration

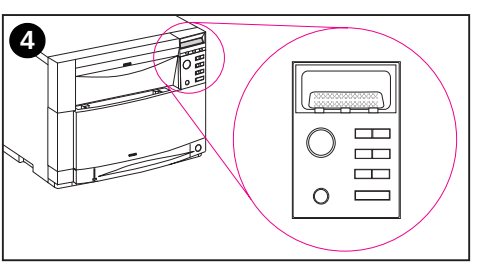
To take advantage of the enhanced bidirectional parallel interface, use a 10-meter (30 ft.) parallel cable (IEEE-1284 compliant) with a 25-pin DB male to a (IEEE-1284C) male “C” connector. Use the following table to verify correct pin configuration.

Signal Name	Printer Pin #	Computer Port #
nSTROBE	15	1
DATA 0	6	2
DATA 1	7	3
DATA 2	8	4
DATA 3	9	5
DATA 4	10	6
DATA 5	11	7
DATA 6	12	8
DATA 7	13	9
nACKNLG	3	10
BUSY	1	11
CALL (PE)	5	12
SELECT	2	13
NAutoFd	17	14
O VDC (GND)	19 – 35	18 – 25
nFAULT	4	15
nSe/In	16	17
nINIT	14	16
PERIPHLH	36	
N.C.	18	







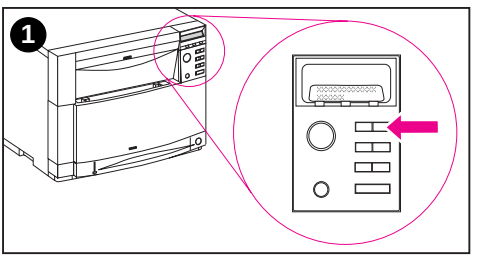


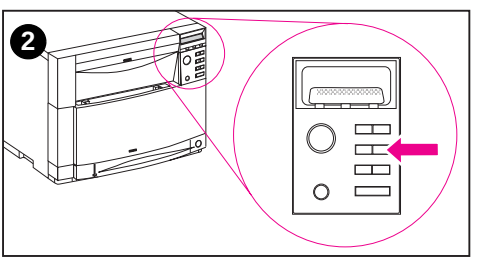
Selecting the display language

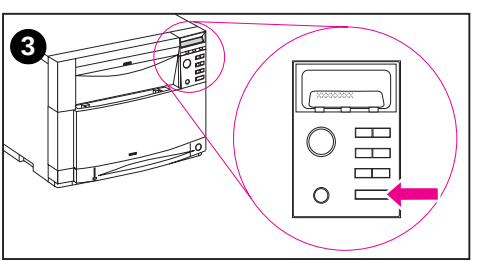
To change the display language on the printer control panel do the following:

1. Press and hold [Select] on the printer control panel while pressing the standby button (power switch). Continue holding [Select] until the control panel displays `SELECT LANGUAGE` (in English). Release the [Select] key.
2. When the control panel displays `LANGUAGE=ENGLISH *`, press [Value] repeatedly until your language choice appears.
3. Press [Select] to save your language choice. Then press [Go].
4. After the printer warms up, the control panel displays the following message in the selected language:
   `TONER POSITION`
   `CYAN = MISSING.`

Note
If the control panel does not display the message in the language you selected, press the printer standby button and repeat the instructions for changing the display language.



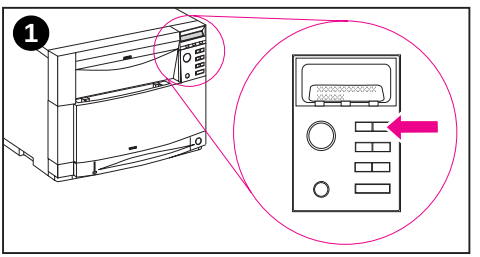


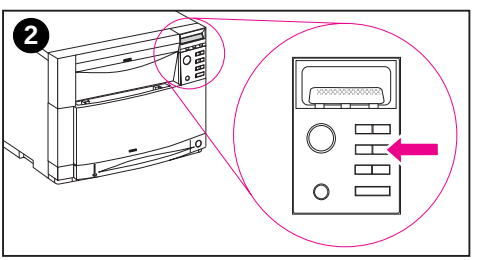


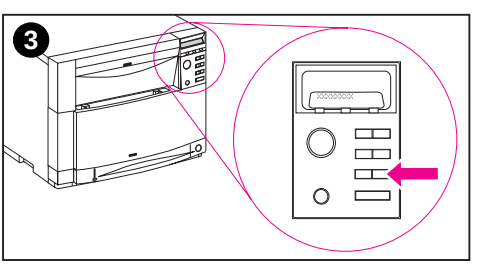
Testing the printer operation

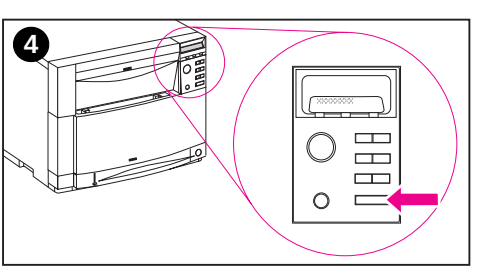
Print a configuration page to ensure the printer is working properly.

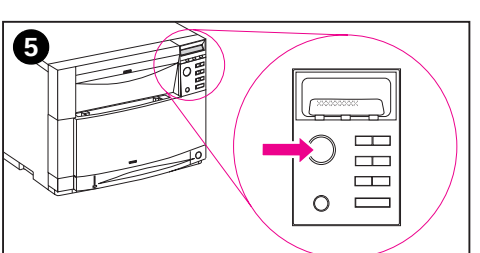
1. On the control panel, press [Menu] until `INFORMATION MENU` appears on the display.
2. Press [Item] until `PRINT CONFIGURATION` appears.
3. Press [Select] to print a configuration page.
4. After about 30 seconds, the configuration page prints. If it does not print, see the “Troubleshooting checklist” in Chapter 7.









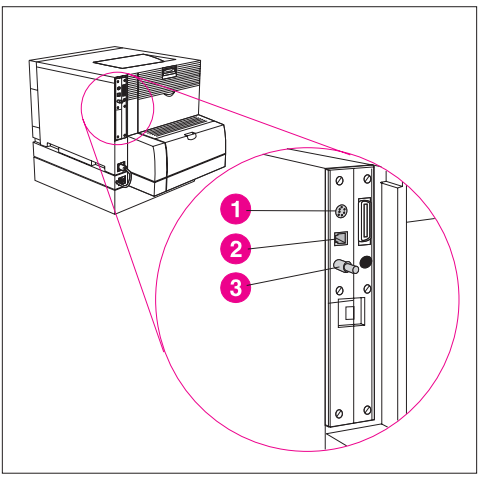


Using PowerSave

PowerSave reduces power consumption when the printer is not in use. The factory default setting for PowerSave is on, and the time setting is one hour. The instructions below explain how to change the time setting and how to turn PowerSave off.

To set PowerSave:

1. On the control panel, press [Menu] until CONFIGURATION MENU appears on the control panel display.
2. Press [Item] until POWERSAVE=1 HR * appears.
3. Press [Value +] or [Value –] to display other time-setting choices between 1 minute and 8 hours, or to turn time setting off.
4. Press [Select] to save your choice. An asterisk (*) appears beside your saved choice.
5. Press [Go]. The control panel displays READY.



Network cable connections

Connecting to a network

The following ports are available on these HP JetDirect print servers:

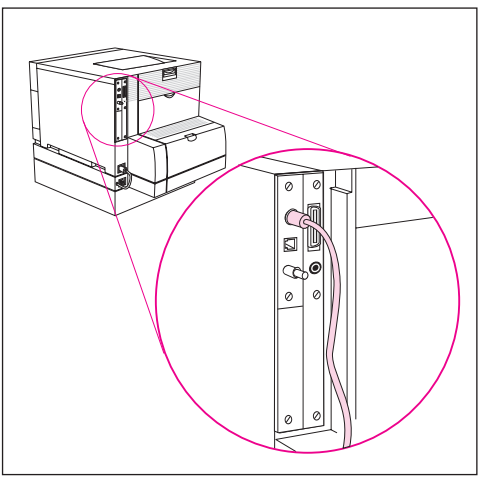
1 LocalTalk DIN-8 port (not available on the HP JetDirect J3113A print server.)

2 RJ-45 port

3 BNC port for ThinLAN coaxial cable (not available on the HP JetDirect J3113A print server)

Note
On the HP JetDirect J3111A print server, you can attach either a ThinLAN cable or a 10Base-T cable, but not both at the same time.

See the instructions that follow to connect one or more network cables to the printer.

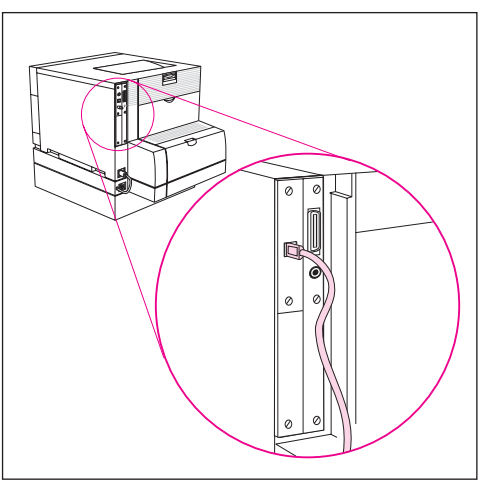


LocalTalk DIN-8 connection

Connecting to a LocalTalk network (J3111A only)

Plug the end of your DIN-8 cable into the LocalTalk port on the HP JetDirect print server. Attach the other end to the network.

Note
Network cables are not included with the printer. They must be purchased separately.

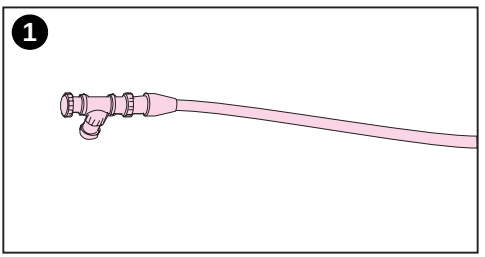


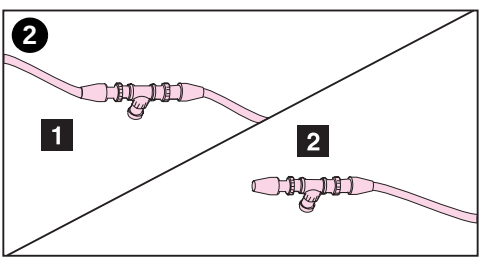
RJ-45 (10Base-T or 10/100Base-TX) connection

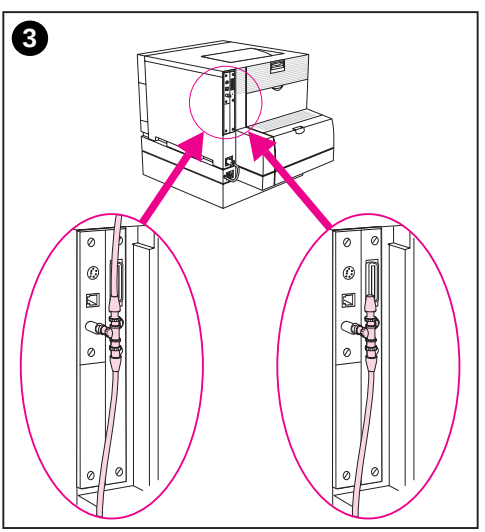
Connecting to a 10Base-T or 10/100Base-TX network

Plug the connector of your unshielded twisted-pair cable into the RJ-45 port. The other end of the cable should be attached to the network.

Note
The HP JetDirect print server supports one Ethernet cable connection at a time.







BNC port

Connecting to a 10Base2 network (J3111A only)

1 Attach one section of your ThinLAN cable to the BNC “T” connector.

2 Attach another ThinLAN cable section ([1]) or a 50-ohm terminator ([2]) to the other side of the BNC “T” connector. If you are attaching the printer to the end of your network, you must connect a 50-ohm terminator.

Note
The BNC “T” connector and 50-ohm terminator for the 10Base-2 connection are not included with the printer. They must be purchased separately.

3 Connect the BNC “T” connector to the BNC port on the HP JetDirect print server.

Note
The HP JetDirect J3111A print server supports one Ethernet cable connection at a time.

Enhanced I/O (EIO) configuration

This printer comes equipped with two enhanced input/output (EIO) slots. These slots hold compatible external devices such as the HP JetDirect 600N Print Server. Plugging EIO cards into the slots increases the number of network interfaces available to the printer.

EIO cards can maximize printer performance when you are printing from a network. In addition, they provide the ability to place the printer anywhere on a network. This eliminates the need to attach the printer directly to a server or a workstation and enables you to place the printer closer to your network users.

The printer control panel will have an additional menu (EIO Menu) if the printer is configured with EIO cards. (See the chapter on using the printer control panel in the online user guide.)

Note Installation of cards and network configuration should be performed by a network administrator.

HP JetDirect print servers

HP JetDirect print servers (network cards) can be installed in one of the printer EIO slots. These cards support multiple network protocols and operating systems. HP JetDirect print servers facilitate network management by allowing you to connect a printer directly to your network at any location. HP JetDirect print servers also support the Simple Network Management Protocol (SNMP), which provides network managers with remote printer management and troubleshooting through HP JetAdmin software.

LocalTalk I/O

The LocalTalk interface enables you to print directly from a stand-alone Apple Macintosh computer or from a Macintosh computer on a LocalTalk network. For specific information on configuring your computer and printer to print through a LocalTalk interface, refer to the printer's getting started guide and the *HP JetDirect Print Server Software Installation Guide*

CPU

The formatter PCB incorporates a 133MHz RISC processor.

Printer drivers

The optimal way to control the printer is through settings in the software application or the printer driver. Changing these settings affects only the print job. Most software applications allow you to choose printing selections from menus within the software application. These software applications selections and printer driver settings override the selections on the printer control panel settings.

Network configuration

Configuring the printer for the network

You can configure certain network parameters on the printer from the printer control panel or, for most networks, from the HP JetAdmin Software (or the HP LaserJet Utility for Macintosh). The utilities are provided on the printing software CD-ROM that comes with the printer. You can also set these parameters from the HP Web JetAdmin Software, which is available at http://www.hp.com/go/webjetadmin.

For a complete list of supported networks and for instructions on configuring network parameters from software such as the HP JetAdmin and HP Web JetAdmin Software, see the *HP JetDirect Print Server Software Installation Guide*. The guide comes on the CD-ROM with printers in which an HP JetDirect 600N print server is installed.

Note

If you are configuring network parameters from the printer control panel, the control panel menu for configuring parameters appears in the languages listed below. If your language is not listed, the menu will appear in English and you will need to configure the printer by using the HP JetAdmin Software (or the HP LaserJet Utility for Macintosh).

Danish	French	Portuguese
Dutch	German	Spanish
English	Italian	Swedish
Finnish	Norwegian	

Configuring Novell NetWare frame type parameters

The HP JetDirect 600N print server automatically selects a NetWare frame type. Select a frame type manually only when the print server selects an incorrect frame type. To identify the frame type chosen by the HP JetDirect 600N print server, print a configuration page.

Configuration tips

HP JetDirect 600N print servers (network cards) provide software solutions for:

- Novell NetWare versions 3.x and 4.x
- Microsoft Windows 3.1 and Windows 95
- Microsoft Windows NT 3.51 and 4.0
- IBM OS/2 LAN Server or Warp Server
- Apple EtherTalk and LocalTalk
- UNIX (HP-UX, Solaris, and SunOS)

For information on installing HP JetDirect 600N print servers and the types of interfaces and network operating systems supported, see the *HP JetDirect Print Server Software Installation Guide*.

NetWare 3.x and 4.x based products

When using Novell NetWare 3.x and 4.x products with the HP JetDirect print server, queue server mode provides improved printing performance over remote printer mode. For more information, see the *HP JetDirect Print Server Software Installation Guide*.

Windows 3.1, Windows 95, and Windows NT 3.51 and 4.0 networks

For Windows 3.1 and Windows 95 networks, HP JetAdmin software works as a Windows application and supports native Novell Directory Services (NDS).

For peer-to-peer Windows 95 networks, HP JetAdmin works as a Windows application, and connects HP printers to an IPX/SPX-compatible printer network using an HP JetDirect print server.

For Windows NT 3.51 and 4.0 networks, HP JetAdmin supports the TCP/IP or IPX/SPX environments.

IBM OS/2 LAN server and Warp server networks

For IBM OS/2 LAN Server and Warp Server Networks, HP JetAdmin supports the DLC environments. Depending on the number of network printers and type of printer driver, when using virtual memory, improved performance may be realized by increasing server RAM, especially if the swapper.dat file is large.

LocalTalk network

The LocalTalk interface enables you to print directly from a stand-alone Apple Macintosh computer or from a Macintosh computer on a LocalTalk network. For specific information on configuring your computer and printer to print through a LocalTalk interface, refer to the printer's getting started guide and the *HP JetDirect Print Server Software Installation Guide*.

Macintosh DIN-8 cable

To connect a Macintosh computer directly to this printer, use a standard Macintosh DIN-8 printer cable. This cable cannot be used in a network configuration.

Note For LocalTalk configuration, the DIN-8 printer cable must be plugged into the printer port of your Macintosh computer.

LocalTalk configuration

To connect the printer to a Macintosh computer on a LocalTalk network, use the HP LocalTalk Cable Kit. You will need a kit for each printer and an additional kit for each Macintosh computer on your network.

UNIX networks

HP JetAdmin software provides a TCP/IP-based solution for configuring and managing HP JetDirect print servers on HP-UX, Solaris, and SunOS systems.

Setting network security on the printer

This printer features control panel locking, which allows network administrators to prevent users from changing certain printer control panel settings. When a menu is locked, unauthorized users trying to change settings in the printer control panel will receive the following message:

```
ACCESS DENIED
MENUS LOCKED
```

You can use the HP JetAdmin Software, the HP LaserJet Utility for Macintosh, or an ASCII escape sequence to perform this procedure. For instructions on locking the printer control panel using either the HP JetAdmin Software or the HP LaserJet Utility for Macintosh, see the online Help for these utilities.

4 Printer maintenance

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- Cleaning spilled toner 73

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Replacing consumable items 76
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- Replacing the fuser kit 83
- Replacing the paper rollers 85

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Overview

This chapter discusses the following topics:

- Cleaning the printer and accessories
- Approximate replacement intervals for consumable items
- Locating consumables
- Replacing consumable items

Cleaning the printer and accessories

To maintain high print quality and performance, thoroughly clean the printer and the paper handling accessories:

- Every time you change the toner cartridge (run a few pages through).
- After printing approximately 5000 pages for CMY and 8000 pages for Black.
- Whenever print quality problems occur.

Clean the outside surfaces with a lightly water-dampened cloth. Observe the warning and caution below.

WARNING! Before you begin these steps, turn the printer off and unplug all power cords to avoid shock hazard.

Be careful when cleaning around the Fusing Assembly area. It may be hot.

CAUTION To avoid permanent damage to the Toner Cartridge, do not use ammonia-based cleaners on or around the printer.

Do not touch the transfer roller. Skin oils on the roller can reduce print quality. If toner gets on your clothes, wipe it off with a dry cloth and wash your clothes in cold water. Hot water sets toner into fabric.

Table 4-1 Cleaning the printer

Component	Cleaning Method
Outside covers	Use a water-dampened cloth. Do not use solvents or ammonia-based cleaners.
Inside general	With a dry lint-free cloth, wipe any dust, spilled toner, and paper particles from the paper path area, the registration roller, and the toner cartridge cavity.
Paper pickup, feed, and separation rollers	Use a water-dampened, lint-free cloth.
Separation pad	Use a dry, lint-free cloth.
Registration roller	Use a dry, lint-free cloth.
Transfer roller	Use a dry, lint-free cloth. DO NOT TOUCH with your fingers.
Fuser	Use a water-dampened, lint-free cloth.

Cleaning spilled toner

Defective toner cartridges can develop leaks. Also, after a paper jam has occurred, there may be some toner remaining on the rollers and guides inside the printer. The pages that print immediately after the jam may pick up this toner.

Clean spilled toner with a cloth dampened with cold water. Do not touch the transfer roller with the damp cloth or with your fingers.

CAUTION Do not use a regular vacuum cleaner to vacuum the toner. Only use a vacuum cleaner equipped with a micro-fine particle filter when cleaning spilled toner.

Approximate replacement intervals for consumable items

You can identify consumable items by their labeling and their blue plastic handles. For instructions on installing consumables, see the installation guides supplied with each consumable item.

The following table lists the replacement intervals for printer consumable items and the control panel messages that prompt you when it is time to replace each item.

Table 4-2 Approximate replacement interval for consumable items

Consumable	Printer Message	Page Count	Approximate Time Period
Black (K) toner cartridge	TONER K LOW or TONER K OUT	9,000 pages[1]	4 months
Cyan (C) toner cartridge	TONER C LOW or TONER C OUT	6,000 pages[1]	2.5 months
Magenta (M) toner cartridge	TONER M LOW or TONER M OUT	6,000 pages[1]	2.5 months
Yellow (Y) toner cartridge	TONER Y LOW or TONER Y OUT	6,000 pages[1]	2.5 months
Drum kit	DRUM KIT LOW or DRUM KIT OUT REPLACE DRUM KIT	25,000 black and white only pages, or 6,250 color pages.	12.5 months for black and white only pages, or 3 months for color pages.
Transfer kit	TRANSFER KIT LOW or TRANSFER KIT OUT REPLACE KIT	100,000 black and white only pages, or 25,000 color pages.	50 months for black and white only pages, or 12.5 months for color pages.
Fuser kit	FUSER KIT LOW or FUSER KIT OUT REPLACE KIT	100,000 black and white only pages, or 50,000 color pages.	50 months for black and white only pages, or 25 months for color pages.

1 The approximate average A4/letter-size page count is based on 5% coverage of individual toner colors. Page counts are only estimations; usage conditions and print patterns can cause results to vary.

2) Approximate lives are based on 2,000 pages per month.

CAUTION Hewlett-Packard recommends the use of HP products in this printer. Use of non-HP products may cause problems requiring service that is not covered by the Hewlett-Packard warranty or service agreements.

Locating consumables

Figure 4-1 illustrates the location of each consumable item.

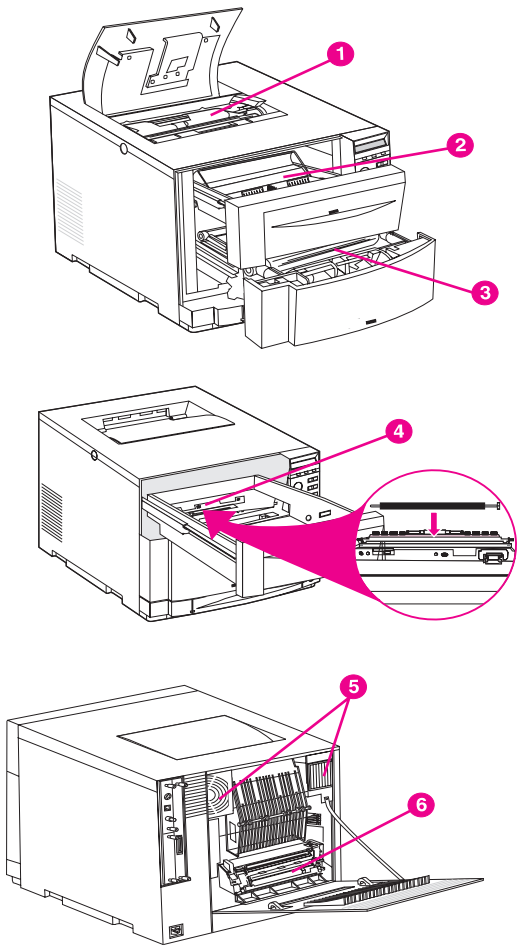


Figure 4-1 **Location of Consumables**

1 Toner cartridges

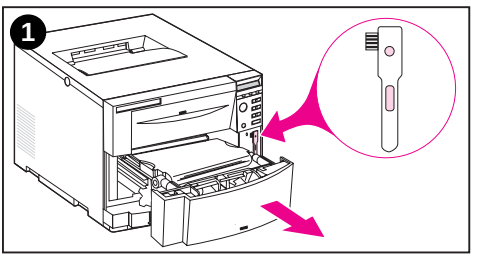
2 Imaging drum cartridge

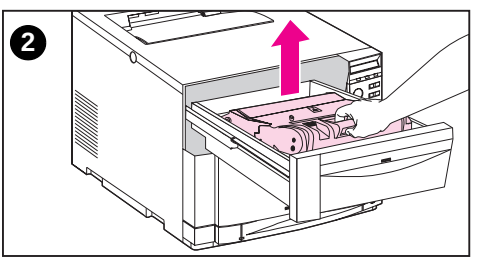
3 Intermediate transfer belt

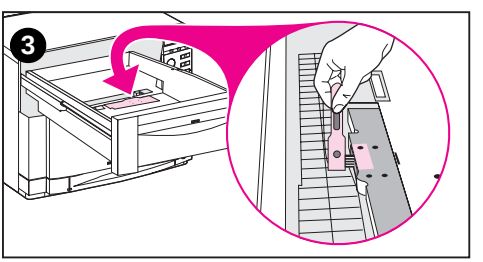
4 Transfer roller

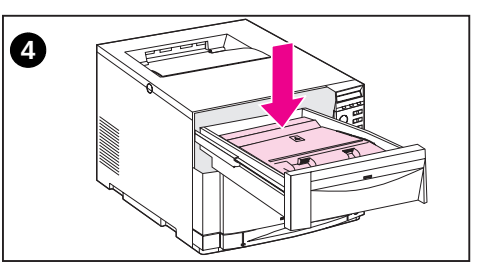
5 Air filters

6 Fuser









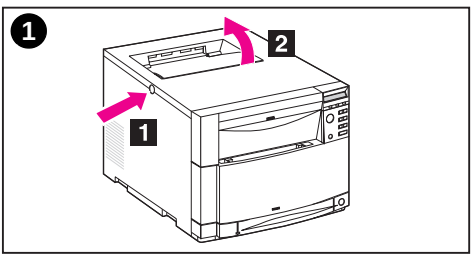
Cleaning the toner density sensor

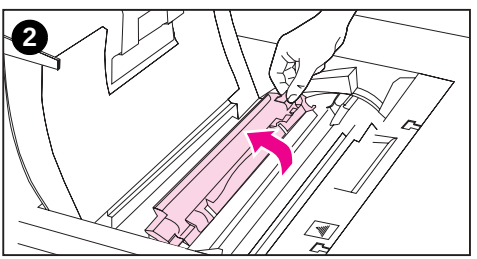
Clean the toner density sensor whenever the imaging drum is replaced or when the control panel message displays: `DENSITY SENSOR OUT OF RANGE`.

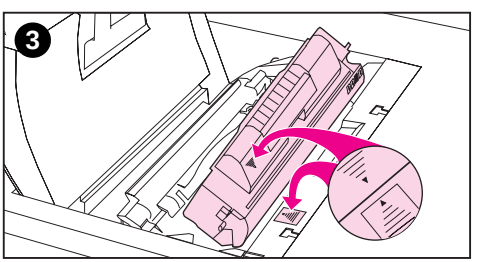
CAUTION
To avoid scratching the sensor, do not clean it with any paper products.

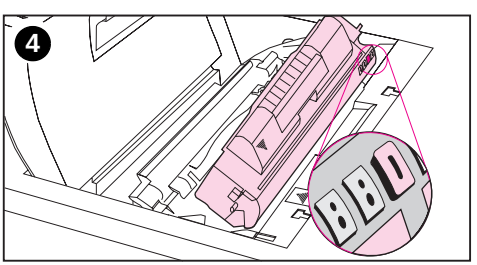
To clean the toner density sensor

1. Open the lower-front drawer and remove the cleaning brush mounted inside.
2. Open the top-front drawer and remove the imaging drum using the blue handle.
3. Using the cleaning brush, remove all dust and toner particles from the sensor as illustrated.
4. Replace the imaging drum.









Replacing the toner cartridges

Replace the toner cartridge when the control panel displays:
TONER CMYK OUT.
The display can indicate that one or more toner colors are out.

1 With the printer turned on and warmed up, push the dark gray release button on the side of the printer ([1]) and open the printer's top cover ([2]).

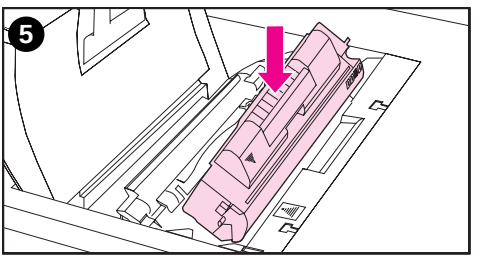
2 Lift the flap that covers the toner cartridge slot and remove the used toner cartridge.

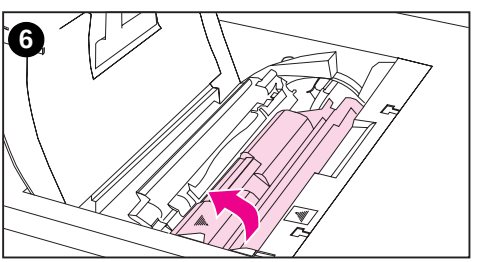
CAUTION
Do not shake the toner cartridges after removing them.

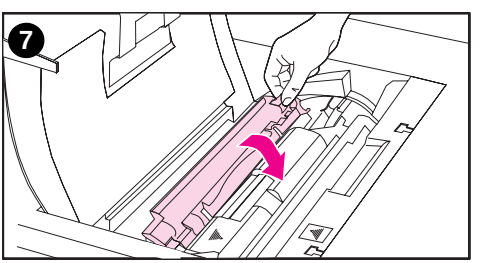
3 Position the toner cartridge over the cartridge slot so that the blue arrow on the toner cartridge points to the blue arrow on the printer.

4 Make sure that the tab on the other end of the toner cartridge aligns with the notch on the cartridge slot.

Note
If the tab does not fit in the notch when you insert the toner cartridge, the toner is the wrong color for that cartridge slot.







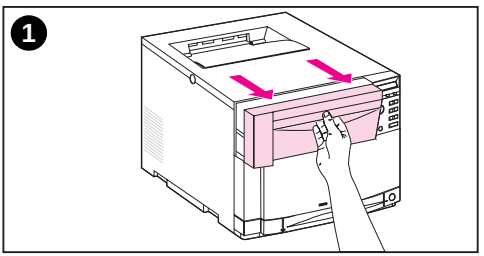
5 Slide the toner cartridge down into the slot until the cartridge stops.

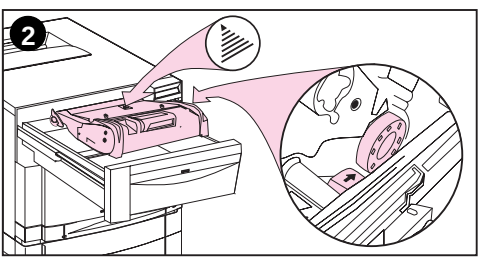
6 Rotate the toner cartridge toward the back of the printer (within the cartridge slot) until the cartridge stops. The cartridge shutter opens to reveal the developer sleeve.

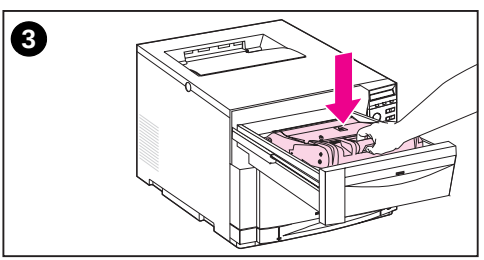
7 Lower the flap that covers the toner cartridge and close the printer's top cover.

Note
You must close the top cover before installing another toner cartridge.

CAUTION
If you need to ship the printer, remove the toner cartridges and imaging drum before shipping.





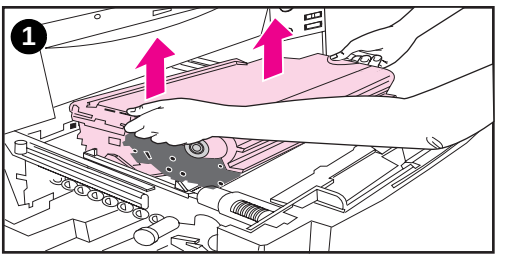


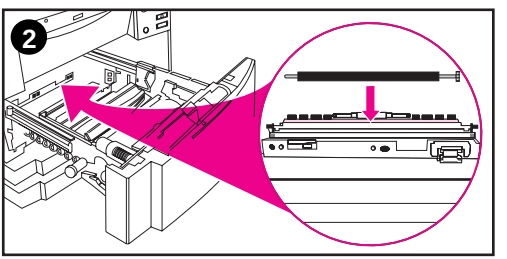
Replacing the imaging drum

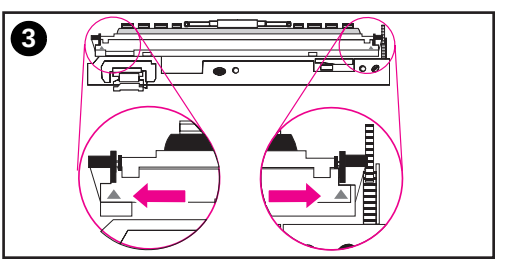
Replace the imaging drum when the printer control panel displays:
REPLACE DRUM KIT

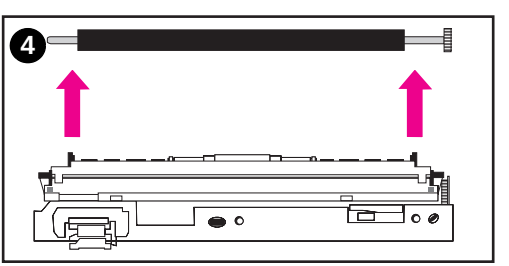
1. Open the upper-front drawer of the printer and remove the used imaging drum.
2. Locate the new imaging drum. Align it over the drawer so that the arrow on top points to the rear of the printer, and the blue end cap on the side fits into the slot identified with the blue arrow.
3. Slide the imaging drum down into place and close the drawer.

CAUTION
If you need to ship the printer, remove the toner cartridges and imaging drum before shipping.









Replacing the transfer kit

Replace the transfer kit when the printer control panel displays:
`TRANSFER KIT OUT REPLACE KIT`.

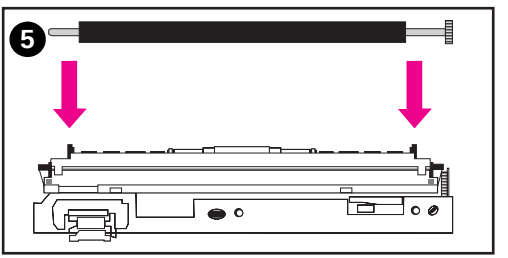
The transfer kit consists of an intermediate transfer belt (ITB), a transfer roller, two air filters, and a hand wipe.

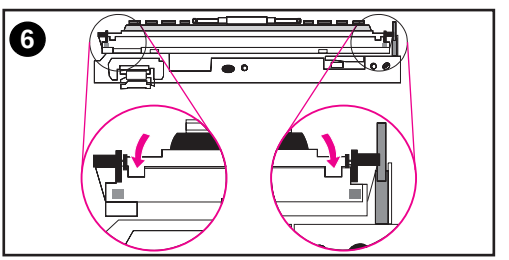
1 Open the middle-front drawer of the printer. Remove the used transfer belt by pulling up on the green handles located on the sides.

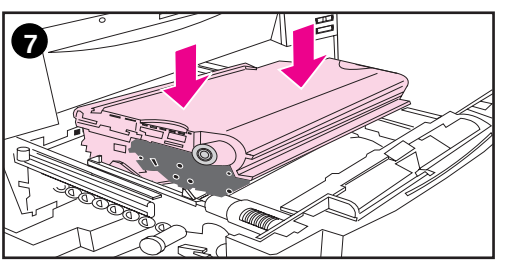
2 Locate the transfer roller inside the printer.

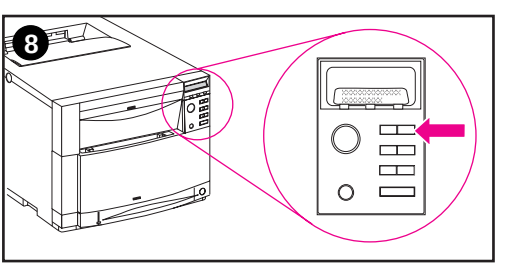
3 To unlock the used transfer roller, gently push down and back on the colored labels that are on the lower corners of the flap that is in front of the roller.

4 Remove the used transfer roller by lifting it up and then out.









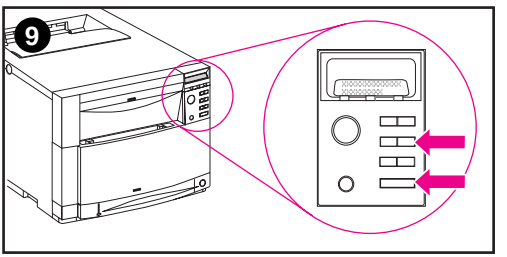
CAUTION
Avoid touching the foam portion of the roller. Oil from your fingers can affect the print quality.

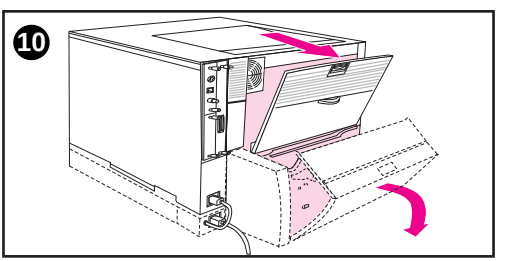
5 Locate the new transfer roller and place it in the notches behind the roller flap.

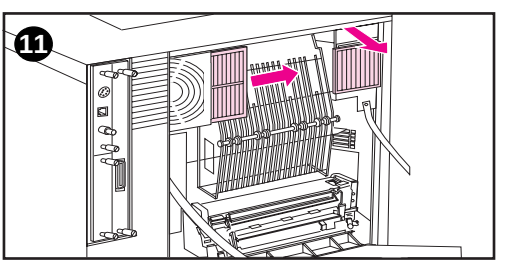
6 Lock in the new transfer roller by gently pushing down on both ends of the roller.

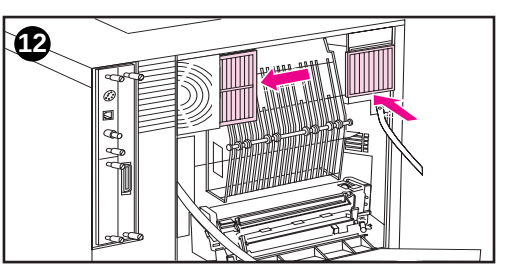
7 Remove the new transfer belt from the bag. Align the blue pins that are on both sides of the new transfer belt with the blue slots in the drawer. Then slide the transfer belt down into place. Close the middle front drawer.

8 To reset the printer for the new transfer kit, push [Menu] on the control panel until `RESETS MENU` appears in the control panel display.







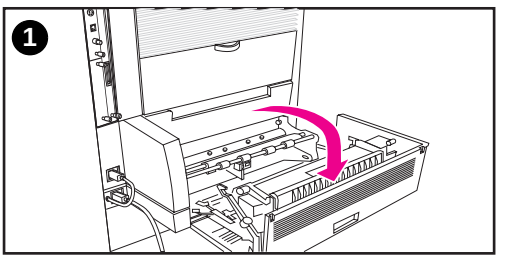


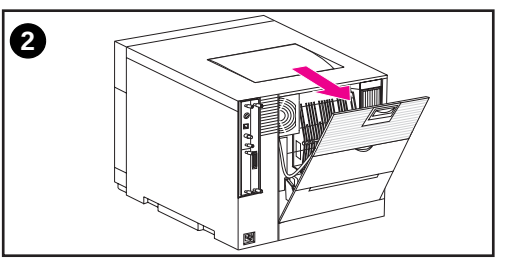
9 Press [Item] until `TRANSFER KIT SELECT IF DONE` appears in the control panel display. Then press [Select].

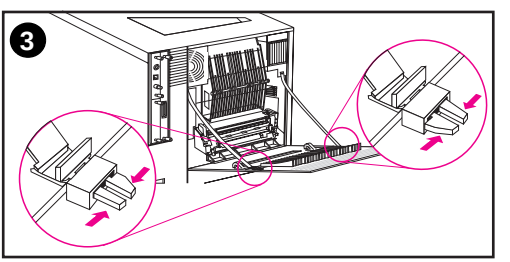
10 To replace the air filters, turn the printer off and wait 10 minutes for the fans to stop running. Unplug the power cord and open the upper rear door of the printer. If the printer has a duplex printing accessory, open the rear cover of the duplex printing accessory.

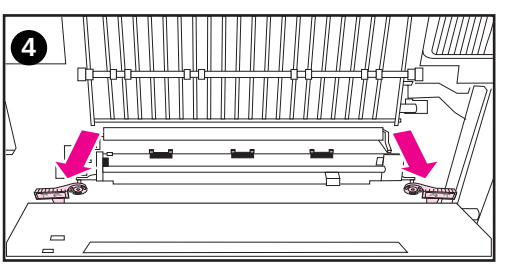
11 Remove the two used air filters from the rear of the printer. Then use the hand wipe to clean excess dust away from the fan areas.

12 Insert the new air filters.









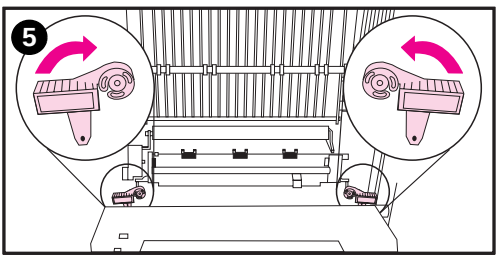
Replacing the fuser kit

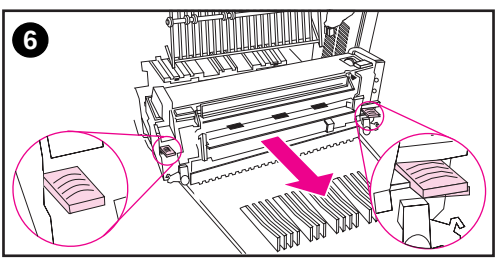
Replace the fuser kit when the printer control panel displays:
`FUSER LIFE OUT REPLACE KIT`.

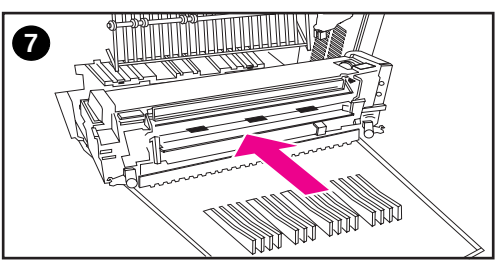
The fuser kit contains one fuser, four paper rollers, and a hand wipe.

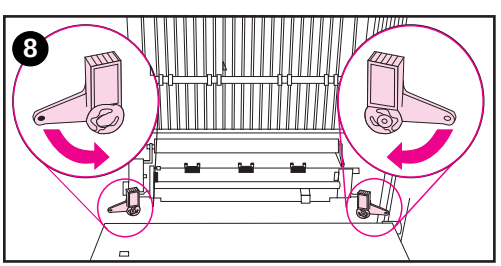
WARNING!
To prevent possible burns, be sure the power cord is unplugged and that the printer has cooled for 30 minutes.

1. Open the upper-rear door of the duplex printer accessory, if attached.
2. Open the upper-rear door of the printer.
3. Release the straps from the rear door by squeezing the latches on the straps where the latches connect to the rear door.
4. Inside the back of the printer, near the bottom, locate the two blue latches on the fuser.









5 Rotate the two blue latches upward 90 degrees.

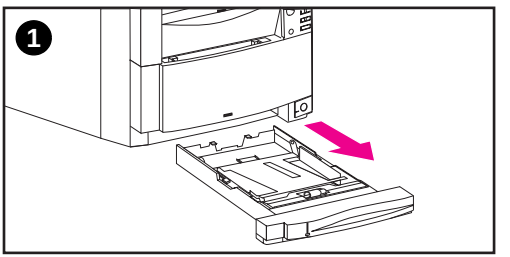
6 Grasp the finger holds on the fuser and pull the used fuser out of the printer.

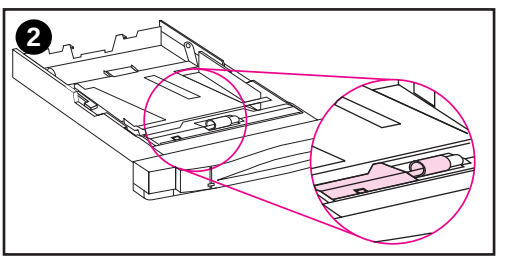
7 Remove the new fuser from the bag using the finger holds. Holding the new fuser by the finger holds, slide the fuser into the printer.

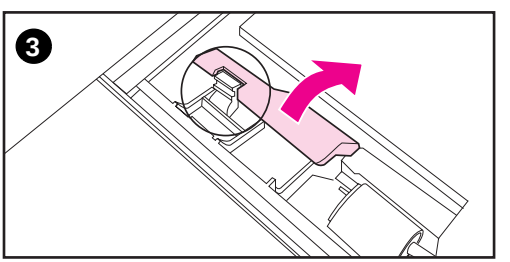
CAUTION

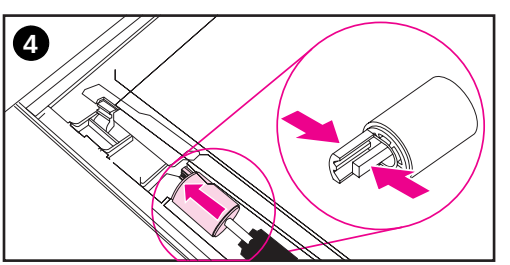
The blue latches will lock only if the fuser is installed.

8 Lock the fuser in place by rotating the two blue latches down. Reconnect the support straps to the upper rear door.







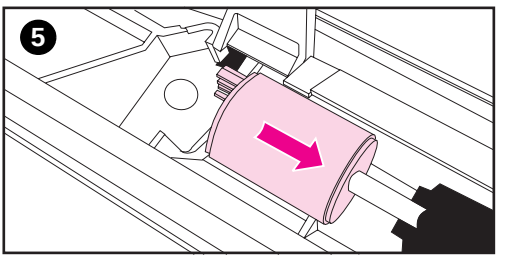


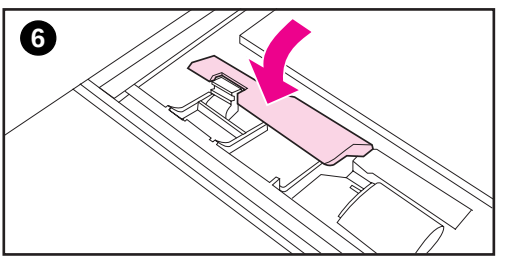
Replacing the paper rollers

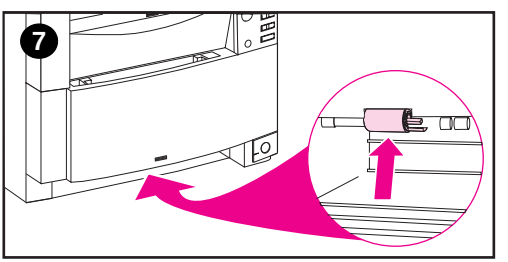
1. Remove Tray 2 from the front of the printer.
2. On Tray 2, locate the paper roller and the cover next to the roller.
3. Squeeze the cover release lever and open the cover.
4. Remove the old paper roller from Tray 2 by squeezing together the blue tabs and then sliding the roller off its spindle.

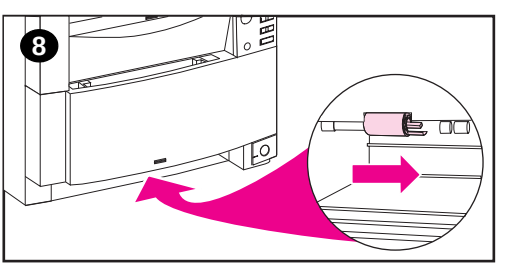
Note

The feed roller has a D-shaped hub and the separation roller has a round shaped hub.







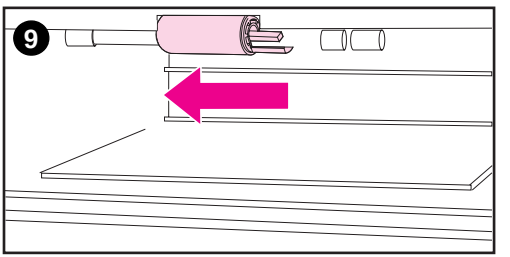


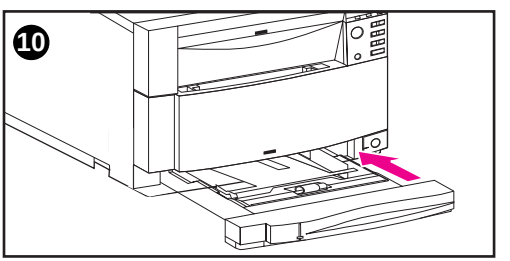
5 Install a new paper roller on Tray 2. Slide the new roller onto the spindle until the roller clicks into place.

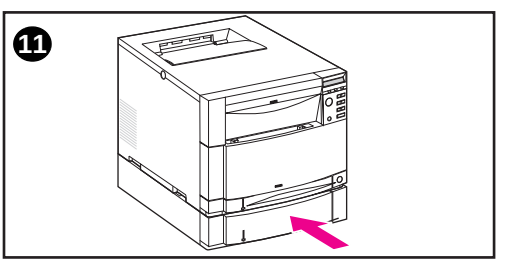
6 Close the cover.

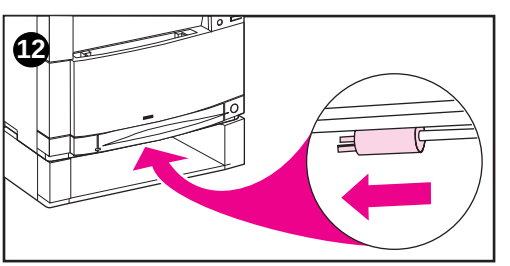
7 Inside the tray cavity on the printer, locate the paper roller in the top of the tray cavity.

8 Squeeze the blue tabs on the roller and remove the old paper roller from the tray cavity.







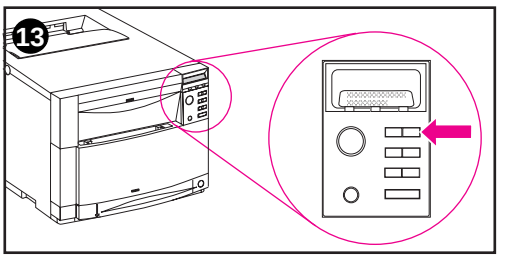


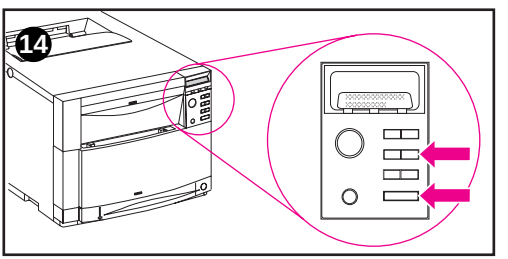
9 Install a new paper roller on the tray cavity. Slide the new roller onto the spindle until the roller clicks into place.

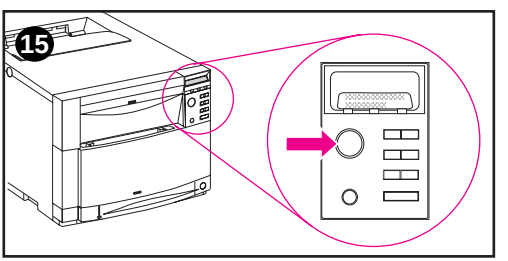
10 Replace Tray 2.

11 If you have the optional 500-sheet paper feeder (tray 3), repeat steps 3-9 to replace the two paper rollers for Tray 3.

12 Remove the paper roller in the tray cavity for Tray 3 in the opposite direction as the paper roller in the other tray cavity.







13 Turn the printer on. When the printer control panel displays READY, reset the printer for the new fuser kit and push [Menu] on the control panel until RESET MENU appears

14 Press [Item] until NEW FUSER KIT, SELECT IF DONE appears. Then press [Select].

15 Press [Go] to return the printer to READY.

DIMM configuration

This printer supports up to 208 MB of memory. You can add additional Random Access Memory (RAM) to this printer by installing Dual Inline Memory Modules (DIMMs). The printer uses 100-pin, non-parity, synchronous DRAM memory modules. Extended Data Output (EDO) DIMMs are not supported.

Note Do not exceed 208 MB of total printer memory.

You can install 4, 8, 16, 32 or 64 MB DIMMs into the printer's three DIMM slots. Synchronous DRAM modules do not need to be configured in pairs (in corresponding left and right slots).

CAUTION Do not attempt to remove the DIMM in slot #4 (see Figure 4-2). The DIMM in slot #4 is part of the printer's firmware. Removing it will affect printer operation.

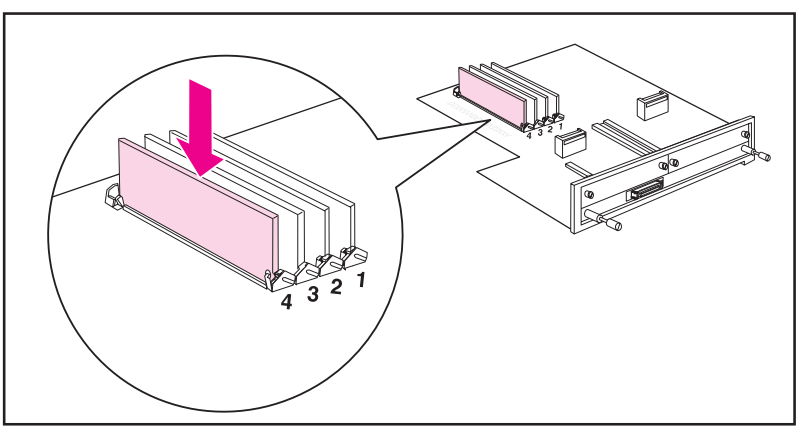


Figure 4-2 **Do not remove the DIMM in slot #4.**

The DIMM slots may be used to add memory, fonts, or firmware upgrades. Note that DIMMs and Single Inline Memory Modules (SIMMS) are not compatible.

Non-volatile memory (NVRAM)

The printer uses NVRAM to store I/O and information on the print environment's configuration. The contents of NVRAM are retained when the printer is deactivated or disconnected. There is one NVRAM on the formatter and one on the DC controller.

5 Theory of operation

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Overview

This section presents the theory of operation and the functional overview for the HP Color LaserJet 4500/4500 N/4500 DN printer. It provides the service representative with an understanding of the printing process.

This chapter is also the course material for the Service Authorization class and discusses the following printing functions.

- Basic operation
- Image formation
- Toner density
- Mechanical system
- Paper path
- DC controller subsystem
- Motors and fans
- Formatter system
- Power supplies

Basic operation

The HP LaserJet 4500/4500 N/4500 DN printer functions are divided into three systems: the image formation system, paper pick-up feed system, and engine control system. These systems will be thoroughly described in this chapter.

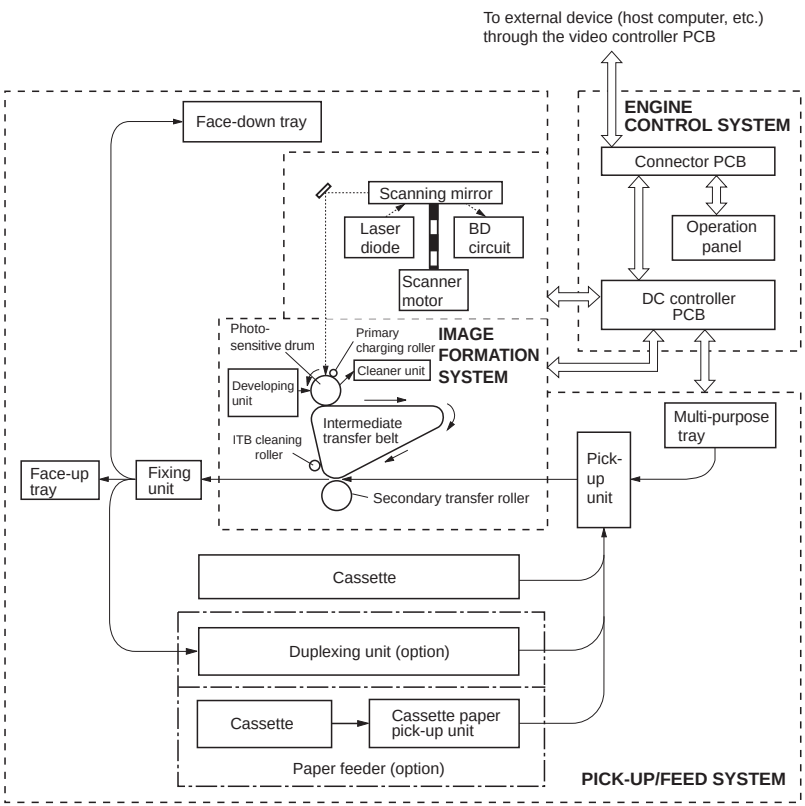

Figure 5-1 **Basic system operation**

Image formation

The image formation is the central hub of the HP LaserJet 4500 printer. During image formation the color image is created.

The image formation section consists of the following imaging units: photosensitive drum cartridge, carousel, laser/scanner, toner cartridges, intermediate transfer belt (ITB) unit, and secondary transfer roller (see Figure 5-2). A detailed description of the imaging units will follow the image formation process.

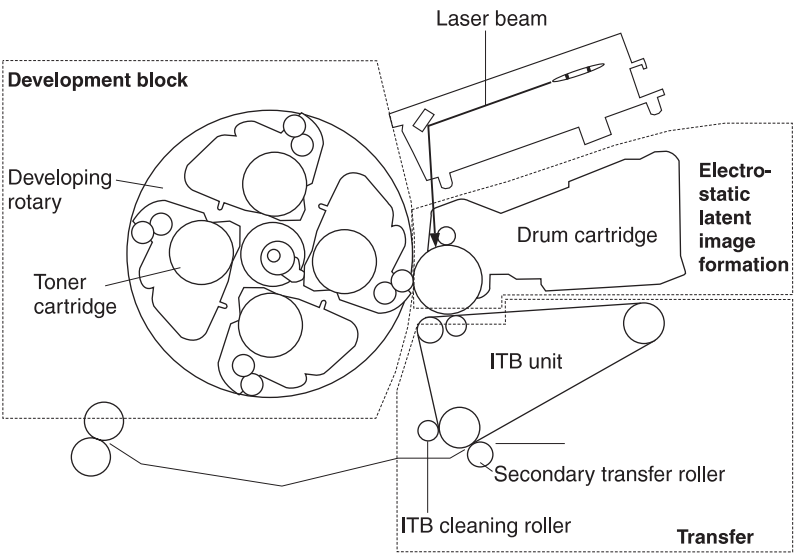

Figure 5-2 **Image formation**

Primary charge

The primary charge roller applies a negative DC bias to the drum. To maintain a consistent charge across the drums surface, an AC bias is also applied. The charge voltage on the drum surface ranges from approximately -700v to -500v. With the large negative charge on the drum surface, a equal positive charge forms below the photoconductive material.

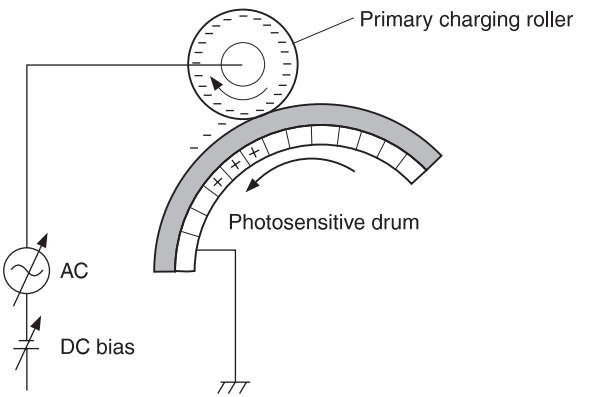

Figure 5-3 **Primary charge**

Laser exposure

When unexposed to light, the photoconductive material acts as an insulator. This allows the negative charge that was placed on the drum's surface by the charging roller to remain in place. Areas of the photoconductor that are exposed the laser become conductive and discharge the negative charge on the surface to the metal cylinder of the drum. These discharged areas are what form the electrostatic image.

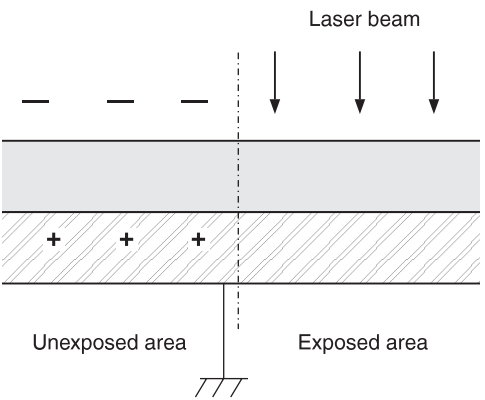

Figure 5-4 **Laser exposure**

Development

With the toner cartridge in position, a negative charge is applied to the toner particles. As the developer sleeve and drum rotate past one another, the toner particles are drawn to the drums surface. Areas of the drums surface which were exposed to the laser attract and hold the toner while the unexposed areas repel the toner.

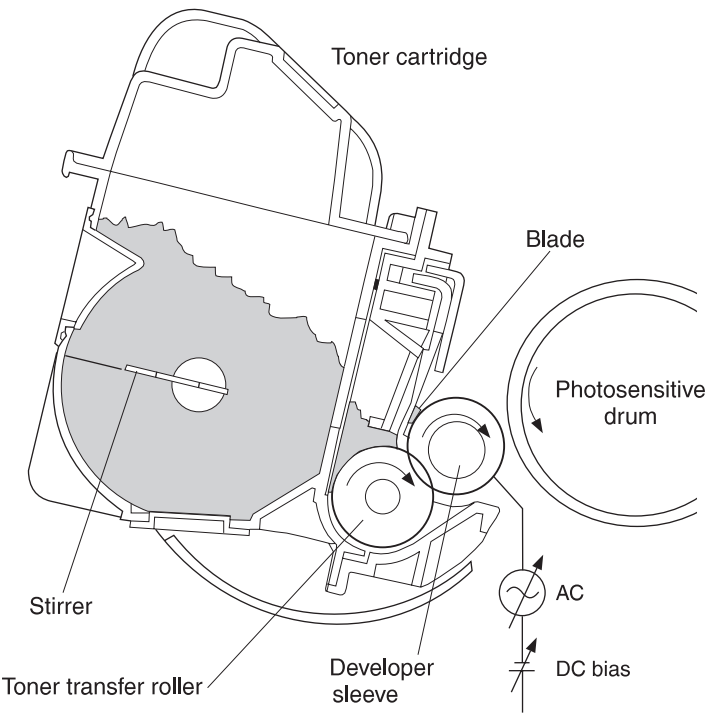

Figure 5-5 **Development**

Transfer

During transfer, the toner image is transferred from the drum surface to the ITB (primary transfer) and then from the ITB to the paper (secondary transfer).

Primary transfer

The ITB has a primary transfer roller that provides a positive bias that pulls the toner image from the drum to the ITB. This process is repeated four times (one time for each toner cartridge) K (black), M (magenta), C (cyan), and Y (yellow). The positive bias applied by the transfer roller increases each pass to compensate for increasing layers of toner. As shown in Figure 5-6, the toner particles still maintain their negative charge. Only the transfer belt is charged positively.

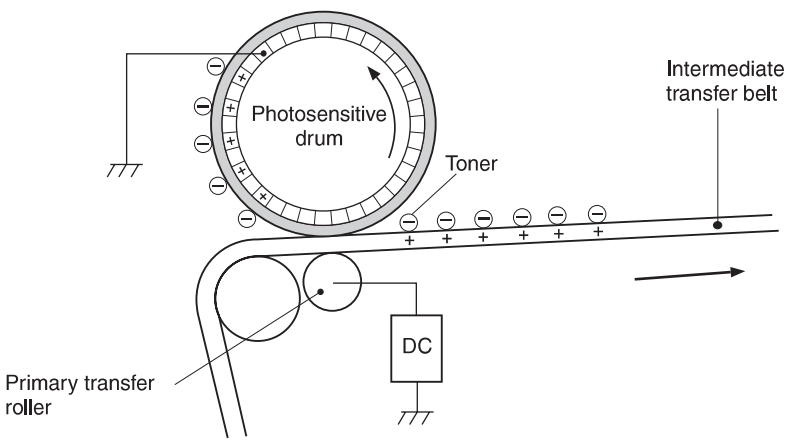

Figure 5-6 **Primary transfer**

Secondary transfer

Once the entire print image is on the Intermediate transfer belt (ITB), the secondary transfer roller is lifted into position. At the appropriate time, media is pulled into the transfer area. With the secondary transfer roller biased at a positive potential, the toner on the ITB is pulled onto the media as the ITB passes over the secondary transfer roller.

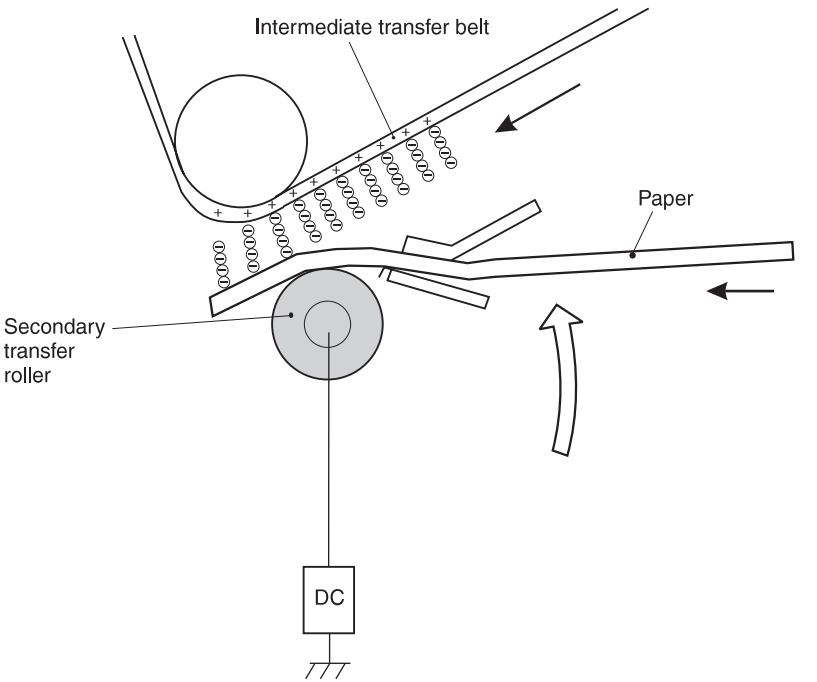

Figure 5-7 **Secondary transfer**

Separation

As the media passes the secondary transfer roller, it passes over the charge eliminator. The charge eliminator removes any positive charge on the media which came from the secondary transfer roller. The elimination of positive charges decreases adhesion of the paper to the belt and allows for better separation.

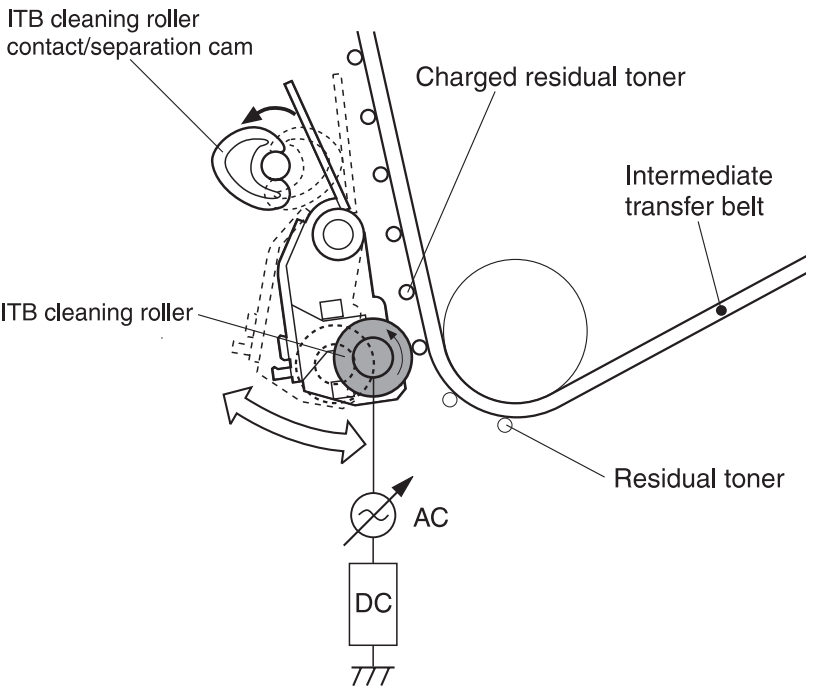

Figure 5-8 **Separation**

Waste toner cleaning

The waste toner cleaning process begins with transfer of residual toner from the ITB to the photosensitive drum. The toner is then transferred to the waste toner reservoir.

Waste toner cleaning operation

Although most of the toner is transferred from the ITB, some residual toner remains. The ITB cleaning roller moves into position and places a positive charge on the residual toner. When the residual toner reaches the drum it is transferred to the drums surface by the drums negative charge. The residual toner is then transferred from the ITB to the drum.

This “waste toner” is then removed from the drum’s surface by a cleaning blade, collected by the sweeper strip, and placed in the waste toner reservoir by the waste toner transfer plates.

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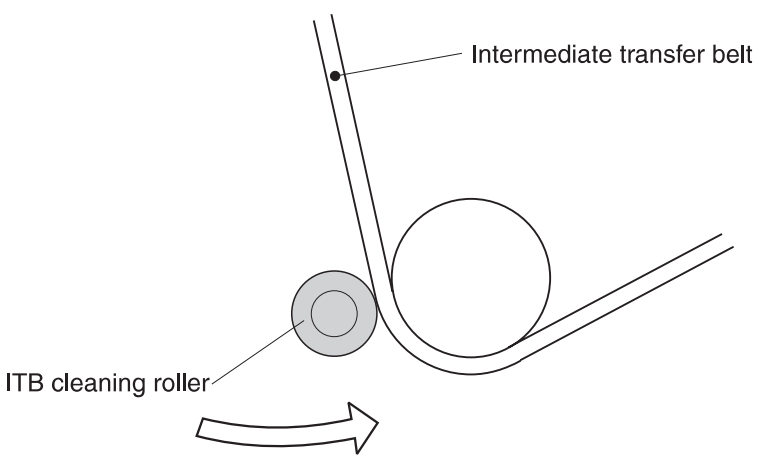


Figure 5-9 **ITB residual toner cleaning**

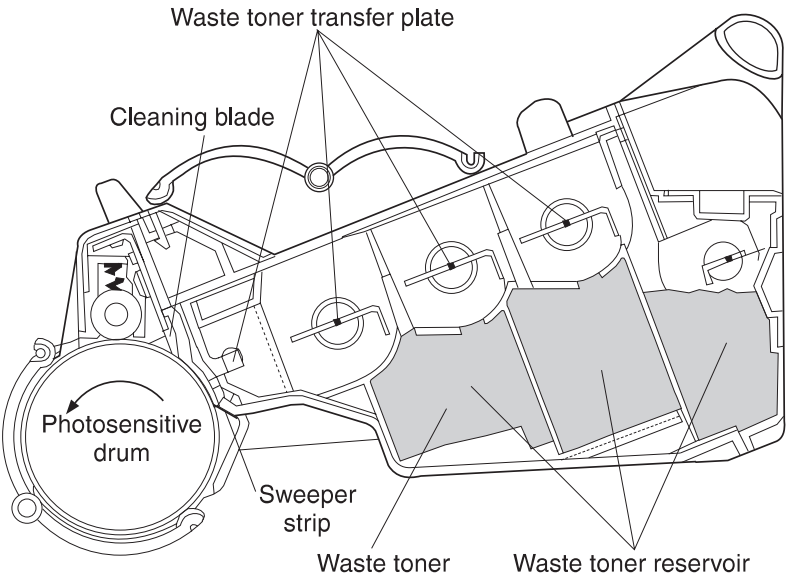


Figure 5-10 **Waste toner to waste toner reservoir**

Fusing

The final step in the image formation process is the fusing of the toner to the media. The heat and pressure provided by the fusing assembly serve two purposes: to both permanently fuse the toner to the media and melt the toner together to produce the full color image on the page. This process uses upper and lower rollers made of Teflon tubing to reduce sticking. Both rollers are heated by Halogen heaters which cause the four colors to fuse and mix on the paper, creating the permanent image.

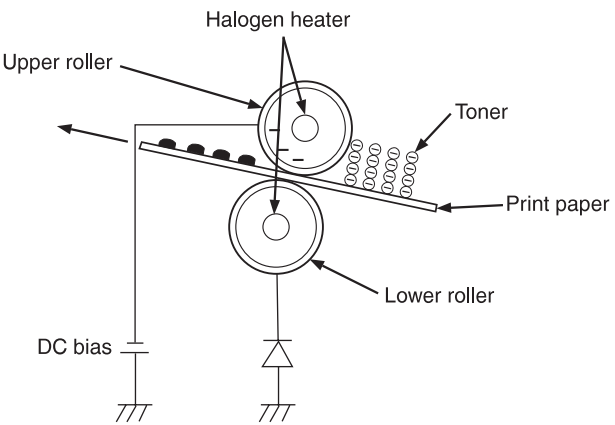


Figure 5-11 **Fuser**

Toner density

Maximum toner density is monitored and corrected if outside of parameters to prevent variations in the toner density. Toner density can vary due to environmental conditions, a deteriorated photosensitive drum, or toner.

A pattern of toner patches with varying densities is laid down on the photosensitive drum. The DC controller detects the density of the these patches and determines the optimum developing bias for each color. The DC controller uses the density sensor (PS14), located in the drum cartridge drawer unit, to read the density of the density detection pattern. PS14 contains a density detection circuit, an LED, and photodiodes 1 and 2. To read the density, the sensor emits light from the LED, reflects it off the density detection pattern on the photosensitive drum, and receives it with photodiodes 2. Photodiode 1 receives the light directly from the LED. The signals from photodiode 1 and 2 are then compared to determine density values. Toner density is monitored and corrected during the following occurrences:

- when the power is activated
- after a certain number of sheets are printed
- when a toner cartridge is replaced
- when the drum cartridge is replaced
- when the printer wakes up after a sleep mode of 6 hours or more

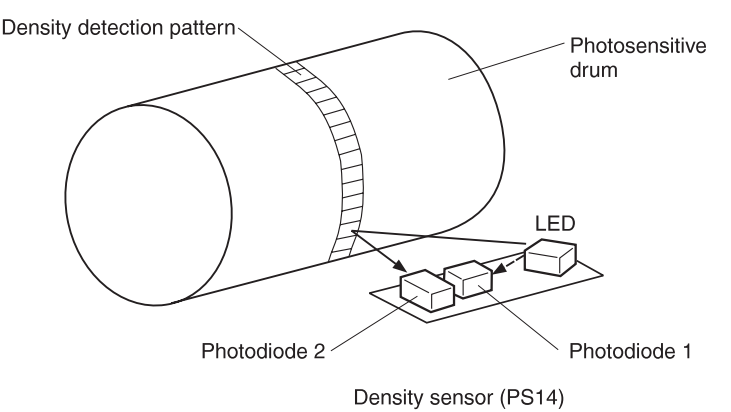


Figure 5-12 **Toner density sensor**

Mechanical system

In this section each of the imaging units involved in the image formation process will be discussed in detail.

Photosensitive drum cartridge

The drum cartridge is a user replaceable assembly containing the photosensitive drum, primary charging roller, drum memory, and waste toner storage. The drum motor (M4) drives the drum drive assembly which in turn drives both the photosensitive drum and, discussed later in the mechanical system, the ITB. Since the primary charging roller's function was discussed in the image formation section, only the drum memory and waste storage areas will be covered here.

Photosensitive drum life

Located inside the drum cartridge is an EEPROM which stores an identification code along with drum life and waste toner information. A life threshold value is used as a comparison number to indicate when the drum has reached its end of life. During printer operation the DC Controller writes to the drum memory at specific times. These times are when power is deactivated, the drum drawer is opened, or whenever 20 pages are printed.

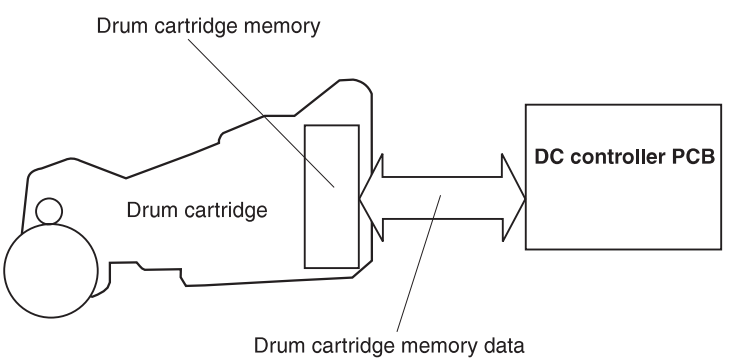


Figure 5-13 **Photosensitive drum cartridge**

Two messages are displayed as the drum cartridge reaches the end of its life. The first is DRUM LIFE LOW and is displayed on the front panel at around 85% of the drum's life. At 100% of life, the message DRUM LIFE OUT will be displayed and the printer will stop printing. A new drum cartridge must be installed at this time.

Waste toner

Inside the drum cartridge are three waste toner reservoirs that store the residual toner left behind during image formation. As discussed earlier in the image formation section, the residual toner from the ITB is transferred to the drum. A cleaning blade scrapes the residual toner off the drums surface. The waste toner is then carried by toner feed plates into the waste toner reservoirs for storage.

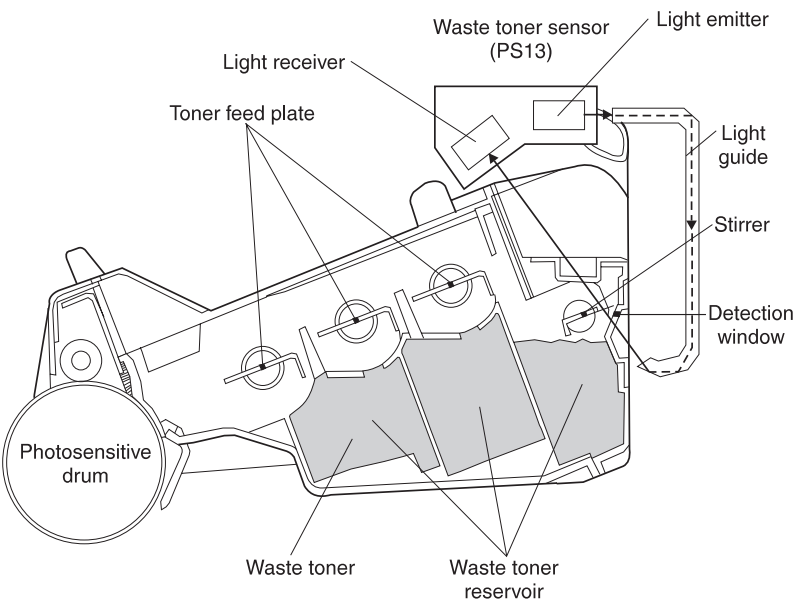


Figure 5-14 **Waste toner**

As the waste toner reservoirs fill, a waste toner sensor (PS13) monitors the level of waste toner. Light from a photo sensor emitter moves along a light guide to a window on the drum. The light passes through one of the waste toner reservoirs, as shown in Figure 5-14, to the receiving side of the waste toner sensor. A stirrer rotates past the window to clean away waste toner to prevent false readings. As the reservoir fills, the length of time the window remains clear shortens. The DC Controller monitors this time and when the threshold is reached the WASTE TONER FULL message is displayed on the front

panel. At this point, the printer stops printing and the drum cartridge must be replaced. Under normal printing conditions the DRUM LIFE OUT message will be seen first. Only when printing full color pages with a high percentage of coverage or when a lot of waste toner is removed from the ITB will the WASTE TONER FULL message be displayed before the drum life out message.

Intermediate transfer belt

The intermediate transfer belt (ITB) is where the entire print image is formed before being transferred to the media. This process is described in the image formation section of this chapter. In this section the operation of the motors and the items associated with the intermediate transfer belt (ITB) will be discussed. Figure 5-15 shows the components associated with the ITB.

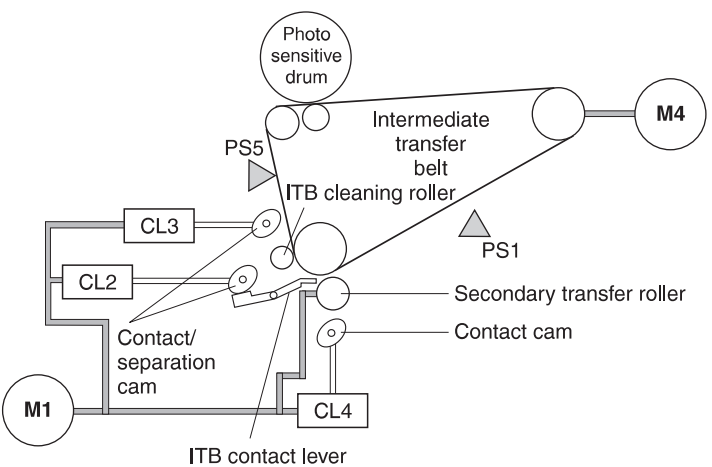


Figure 5-15 Transfer unit function

When the printer receives a print command, the ITB is lifted into position against the drum. This is accomplished when the ITB lift cam is rotated and the cams press against the lift levers located on each side of the ITB. Drive force for the ITB lift cam is provided by M1 and applied to the cam when CL2 is activated.

Once CL2 is activated to lift the ITB, both CL4 and CL3 are activated to position the transfer roller and cleaning roller against the transfer belt. The transfer roller is used to stabilize the belts side to side movement during its initial contact with the drum while the cleaning roller prepares the belt for the image. Just before the black image reaches the transfer roller, both CL4 and CL3 are deactivated again to

remove the transfer roller and cleaning roller from the transfer belt. This procedure only occurs when the ITB is lifted into position against the drum.

The print process continues as described in the image formation section. Once the full image is on the ITB, both CL4 and CL3 are activated, and the transfer roller and cleaning roller are moved into position against the ITB. This time the image is transferred from the ITB to the media. Any residual toner left on the ITB is charged positively for removal.

Once the print job is complete, CL4 and CL3 are deactivated and the transfer and cleaning rollers are moved away from the belt. CL2 is then deactivated and the ITB is lowered to move it away from the drum.

Home position detection

The home position of the ITB is detected to precisely transfer the four toners to the intermediate transfer belt and align the leading edge of print paper with the leading edge of the image.

In the area outside of the toner transfer area of the ITB, there are home position detection holes. With the ITB rotating, the home position detection sensor (PS5) detects a hole and sends the information to the DC controller.

When the ITB home position detection signal is detected by the DC controller, it sends a top of page signal to the formatter. The formatter sends the image data and the DC controller begins to create the image. For full color printing, this process is repeated four times to form the image.

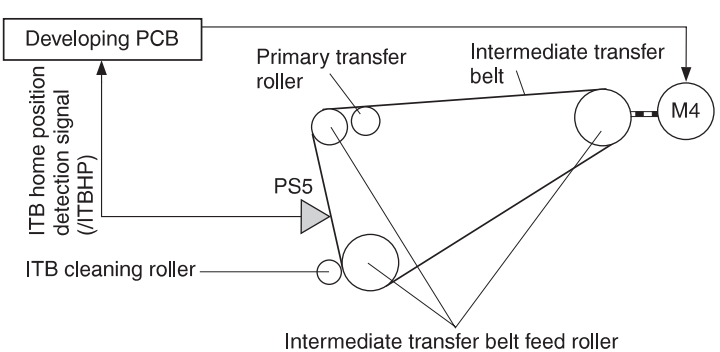


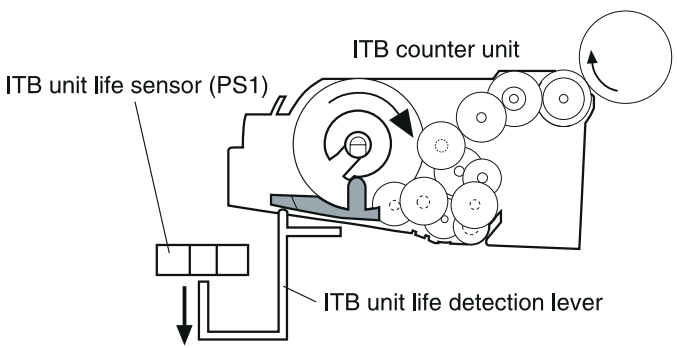
Figure 5-16 **Home position detection**

ITB unit life detection

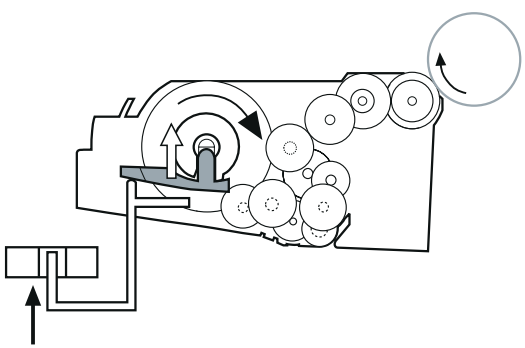
The ITB counter unit is located on the side of the ITB unit. The counter unit consists of a number gears, including the counter gear, and an ITB unit life detection lever. The gears indicate to the ITB counter gear the number of rotations (turns) made by the intermediate transfer belt.

A “page count” is also stored on the formatter which is used for informational purposes only. When a configuration page is printed, the percentage of ITB life remaining is indicated based upon this page count. If the ITB unit is replaced prematurely or the percentage of life is inaccurate, the page count in the formatter must be manually corrected.

Once the ITB counter gear has rotated one complete turn, the tabbed lever drops into the gear notch. This causes the life detection lever to block light from the ITB unit life sensor (PS1). When light is blocked from PS1, the DC controller sends the formatter a warning that the end of the ITB unit life has been reached.



When the end of the ITB unit life has not been reached



When the end of the ITB unit life has been reached

Figure 5-17 ITB unit life detection

Secondary transfer roller unit

The secondary transfer roller is normally detached from the ITB. This operation presses paper against the ITB with the secondary transfer roller at the time of secondary transfer. During “first page out,” the secondary transfer roller engages with the belt prior to drum to belt image transfer to stabilize the belt from side to side movement. The roller stays engaged while the black image is being transferred to the ITB. Just before the black image reaches the secondary transfer roller, the transfer roller disengages from the ITB.

Following image transfer from the photosensitive drum to the ITB and after the paper is positioned in front of the registration rollers, the DC controller turns on the secondary transfer roller clutch (CL4). Once CL4 is on, the secondary transfer roller contact/separation cam rotates and lifts the secondary transfer roller mount. This presses the secondary transfer roller against the intermediate transfer belt prior to the paper arriving from the registration rollers. Bias for the roller is turned on to enable image transfer from the belt to the paper. Once the print job is finished and the paper has passed through the unit, the DC controller then turns CL4 off and secondary transfer roller disengages from the ITB.

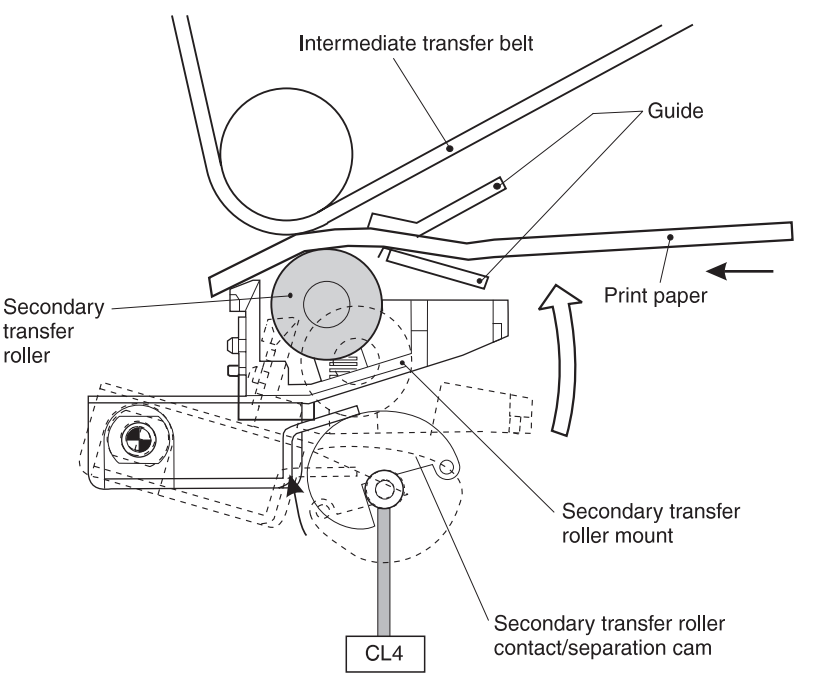


Figure 5-18 **Secondary transfer roller unit**

ITB unit contact/separation unit

Normally, the intermediate transfer belt is separated from the photosensitive drum. This operation presses the belt against the drum by moving the ITB unit contact lever at the beginning of print operation.

When the fusing unit temperature reaches the print temperature at the beginning of the print operation, the DC controller turns the ITB unit contact/separation clutch (CL2) on. Once the ITB contact/separation clutch is on, the ITB unit contact/separation cam pushes on the ITB contact/separation lever. This causes the lever to lift up on the ITB until it comes into contact with the photosensitive drum. The ITB will stay engaged with the drum throughout the transfer process. Once the entire print job is complete and CL3 and CL4 have been deactivated, the DC controller turns CL2 off and the ITB is lowered away from the photosensitive drum.

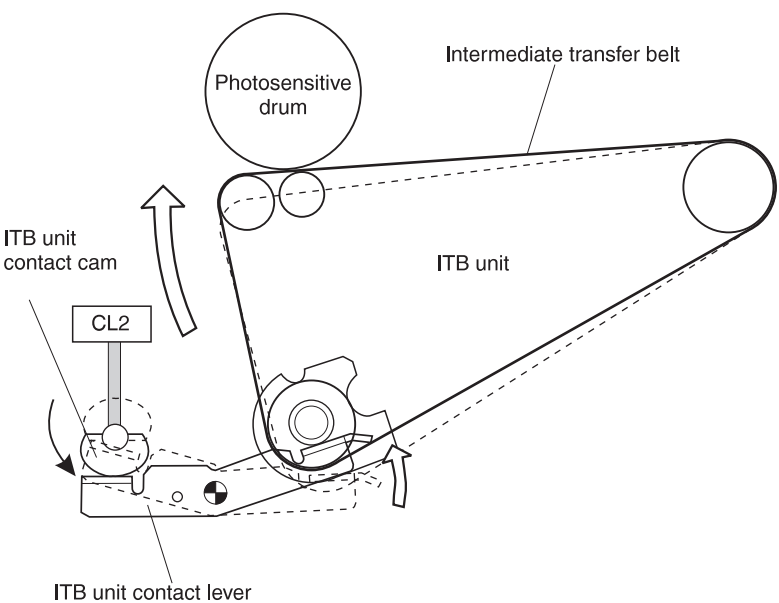


Figure 5-19 ITB unit contact/separation unit

Toner carousel

The toner carousel holds the printers four toner cartridges: K (black), M (magenta), C (cyan), and Y (yellow).

The carousel motor (M3) rotates the carousel and the toner cartridge motor (M5) provides the drive for the toner cartridge peripheral devices to correctly position the toner cartridge.

The carousel contains three sensors: developing carousel position sensor (PS10), toner cartridge contact/separation sensor (PS11), and the toner level sensor (PS12). These sensors as well as the detailed operation of the carousel assembly will be discussed on the following pages.

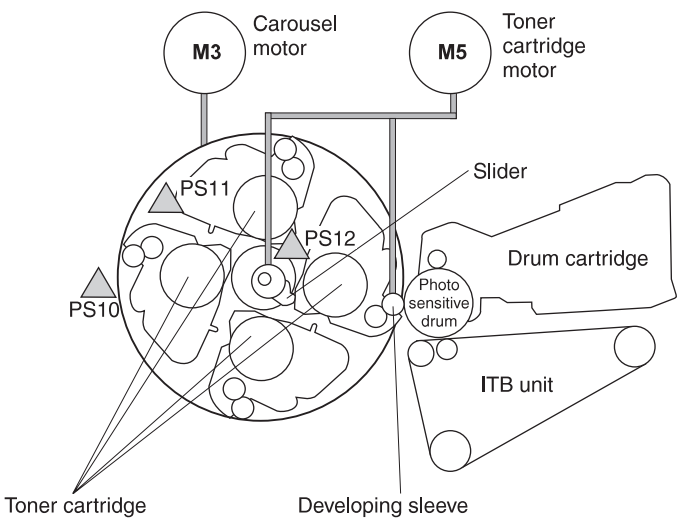


Figure 5-20 **Toner carousel assembly**

Table 5-1 Toner carousel assembly components

Reference	Description
M5	Toner cartridge motor
M3	Carousel motor
PS10	Carousel position sensor
PS11	Toner cartridge contact/separation sensor
PS12	Toner level sensor

Operation

The DC Controller activates carousel motor (M3) and rotates the carousel. As the carousel rotates, the position sensor (PS10) monitors the carousel for the stop position flags. Each stop position flag is used as a development and toner cartridge removal flag (see figure 5-21). When a flag is detected, the DC controller monitors the time it takes the flag to pass the sensor (PS10). Each flag is a different width and therefore takes various times to pass the sensor. This time lapse is used by the DC Controller to determine which development/removal stop position flag has passed the sensor. When the carousel turns to the correct position, the DC controller stops the carousel motor (M3) and the carousel from rotating any further.

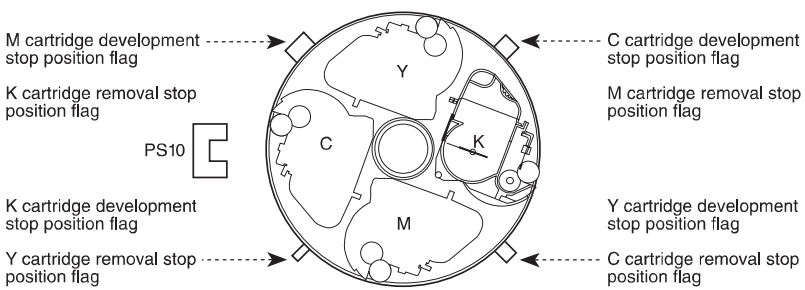

M cartridge development stop position flag
K cartridge removal stop position flag
PS10
K cartridge development stop position flag
Y cartridge removal stop position flag
Y
C
K
M
C cartridge development stop position flag
M cartridge removal stop position flag
Y cartridge development stop position flag
C cartridge removal stop position flag

Figure 5-21 **Toner carousel operation**

Toner cartridge contact/separation function

This function brings the developing sleeve closer to the photosensitive drum by pushing the toner cartridge push cam out so that the toner cartridge rotates up onto the cam.

The DC controller determines the time lapse of the developing stop position flag with the carousel position sensor (PS10) to determine that the toner cartridge is in position. The DC controller then activates the toner cartridge motor (M5), and the motor begins to rotate clockwise. This causes the toner cartridge push cam to rotate and push out. The toner cartridge then rotates up onto the cam. This positions the toner cartridge and the developer sleeve near the drum and puts the spacers in contact with the drum (see Figure 5-22).

The toner cartridge contact sensor (PS11) detects when the toner cartridge is close to the drum (see figure 5-23). Once the toner cartridge is facing the drum, the DC Controller deactivates the carousel motor (M3) which stops the rotation of the carousel. At the same time, the DC controller starts development by rotating the toner cartridge motor (M5) counter clockwise to begin rotation of the developing sleeve.

Once development is complete, M5 again rotates clockwise moving the toner cartridge away from the drum. The toner cartridge contact sensor (PS11) detects when the toner cartridge has moved away from the drum. The carousel motor (M3) again begins the carousel rotation, and the process is repeated for each toner cartridge.

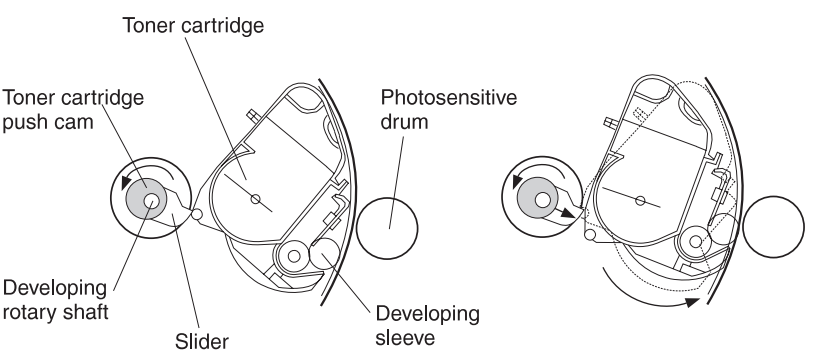


Figure 5-22 **Toner cartridge contact/separation function**

Toner level detection/toner cartridge detection

This function detects the remaining toner level in the toner cartridge and the presence of the toner cartridge in the carousel.

While the toner cartridge is facing the photosensitive drum, light from the light emitter diode passes through the light guide in the carousel and enters the detection port of the toner cartridge. The light passes through the cartridge when the toner around the detection port is scraped off by the cartridge stirring function and is detected by the light receiver of the toner level sensor (PS12): see figure 5-24. The time until the toner covers the port again and light cannot pass through is measured.

When the light passing through the cartridge exceeds a specified time before being interrupted by toner, the DC Controller warns the formatter of a “toner life low.” This message is also displayed on the control panel. When light passes through the cartridge all the time without interruption, the printer is stopped by the DC Controller, the formatter is notified that no toner is left in the cartridge. A “*TONER OUT*” message also appears on the control panel.

Note

The stirrer is also used to supply toner smoothly to the sleeve. The toner cartridge motor (M5) rotates the stirrer and the toner feed roller. Both the stirrer and the toner feed roller stir the toner in the toner cartridge.

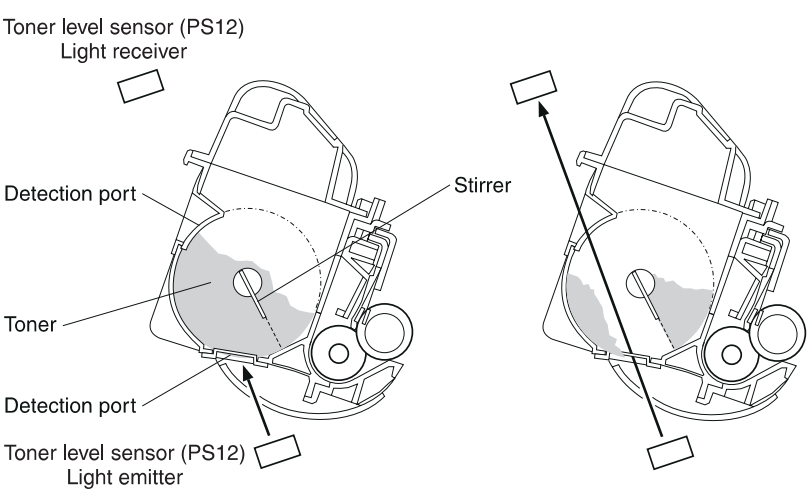


Figure 5-23 **Toner level detection/toner cartridge detection**

Laser/scanner operation

The DC controller signals the laser driver to activate the laser diode which generates the laser beam. The laser beam is aligned by the collimator lens and the cylindrical lens. The beam then strikes the six-faced prism mirror located atop the scanner motor, while the mirror is rotating at a constant speed. The beam is then reflected and brought to a point to maintain a consistent round dot (focused) on the drum surface by the focusing lens. At the beginning of the scan line, the beam first strikes the Beam Detect (BD) mirror and then the BD PCB. After the initial strike, the beam strikes the drum surface. With the drum rotating at a constant speed, the laser beam successively scans across the drums surface exposing the image.

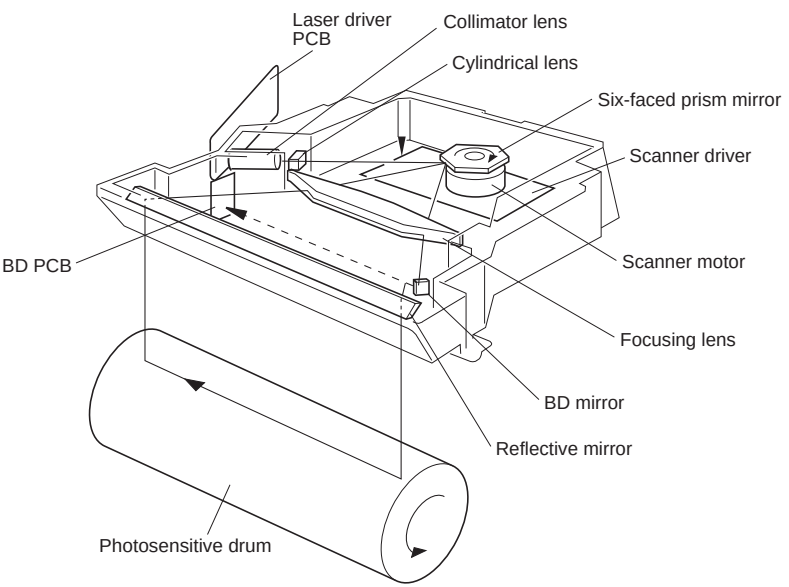


Figure 5-24 **Laser/scanner operation**

Paper path

Introduction

For cassette feeding, a sheet of paper is picked up by the cassette pick-up roller and is then fed by the feed rollers. For manual feeding, a sheet of paper is picked up by the multi-purpose tray pick-up roller and is then fed by the feed rollers. The pick-up motor (M2) provides the drive for the front of the paper path.

Once paper is fed into the general paper path, the paper passes through the registration rollers. The paper is temporarily stopped so that the paper's leading edge will match the leading edge of the image on the photosensitive drum. The paper then passes between the secondary transfer roller and the ITB. The paper continues past the web transport and past the upper and lower fusing rollers to either the face-up tray or the face-down tray.

The paper path is shown in Figure 5-25.

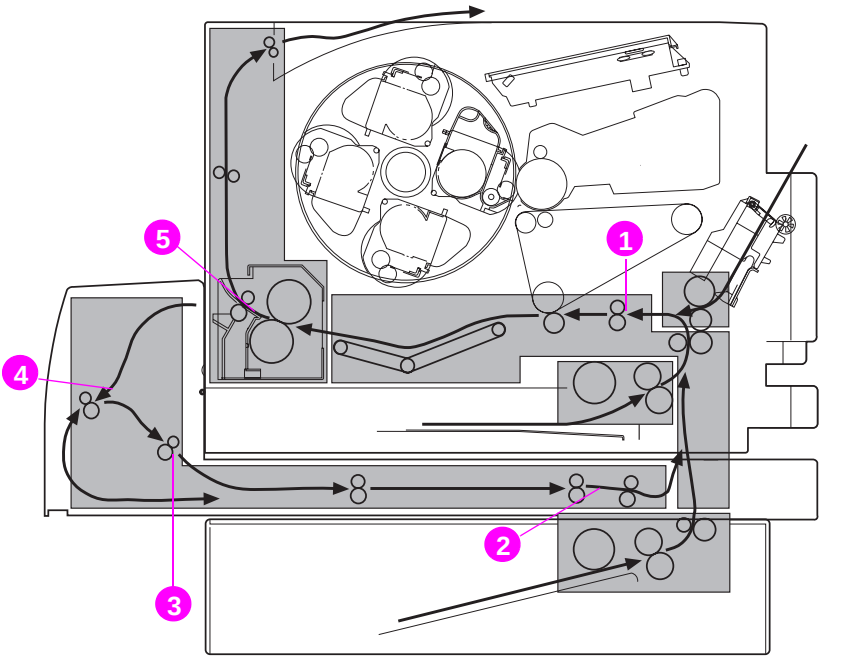


Figure 5-25 **Paper jam sensors** **(shown with the optional 500-sheet paper feeder and duplex printing accessory installed)**

1 Registration paper sensor (PS2)
2 Duplex paper-pick sensor (PS3104)
3 Reversed unit paper sensor (PS3103)
4 Reversed paper sensor (PS3101)
5 Delivery paper sensor (PS7)

Tray 2 (cassette)

The cassette paper sensor (PS8) senses paper on the cassette. Three paper-size detection switches (SW801, SW802, and SW803) detect both the paper size and the presence of a cassette.

The timing of the paper pick-up and feeding is based on the home position of the ITB. The pick-up motor (M2) provides the drive force for the front of the paper path. Once the paper-size detection switch receives the ITB home position detection signal. The cassette feed solenoid (SL2) is activates. This solenoid transmits the rotational force of the pick-up motor to the cassette feeding pick-up roller. This roller then picks up the paper.

A separation roller prevents multiple sheets from being fed, paper is fed into the printer. The cassette feed roller and another feed roller feeds the paper into the printer. The paper then passes the registration paper sensor (PS2) and reaches the registration roller. Because the registration roller is not currently rotating, the paper temporarily stops. The paper's leading edge is then curled and any skew is corrected.

Next, the DC controller activates the registration clutch (CL1), which feeds the paper to the secondary transfer unit. The leading edge of the image on the intermediate transfer belt is then matched with the leading edge of the paper. The paper is then fed to the fusing and delivery units (see Figure 5-26).

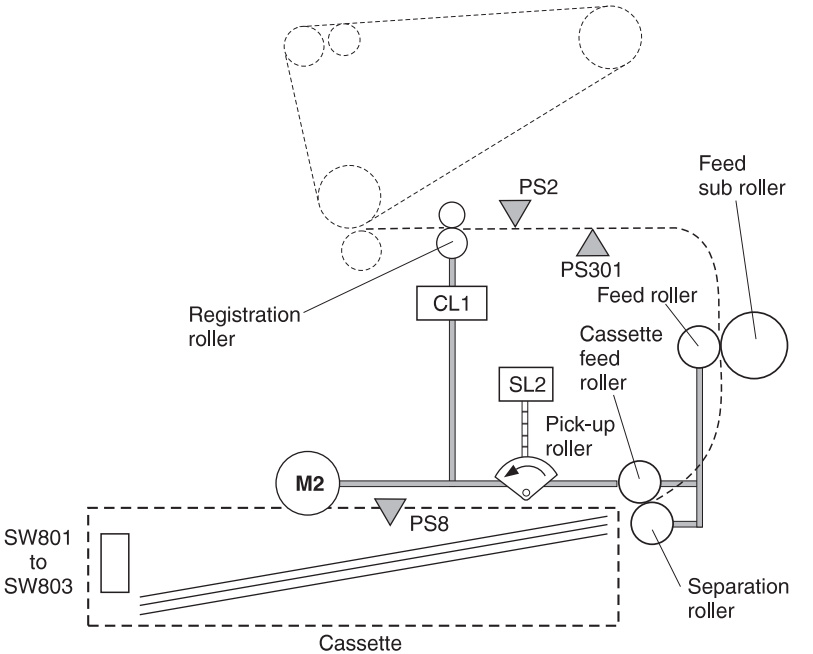


Figure 5-26 **Tray 2 (cassette) operation**

Table 5-2 Motors, solenoids, sensors, and switches

Reference	Description
M2	Pick-up motor
SL2	Cassette pick-up solenoid
CL1	Registration clutch
PS2	Registration paper sensor
PS301	OHT Sensor
PS8	Cassette paper sensor
SW801	Paper-size detection switch
SW802	Paper-size detection switch
SW803	Paper-size detection switch

Tray 1 (multi-purpose tray)

The multi-purpose tray paper sensor (PS4) senses the presence of the paper in the multi-purpose tray. The manual feed solenoid (SL1) transmits the rotational force of the pick-up motor to the manual feeding pick-up roller. As the pick-up roller rotates, the pick-up cam pushes up the paper-lifting plate. This causes the paper to be pressed against the pick-up roller and thus picked-up by its rotation. After the separation pad separates multiple sheets, the paper is fed into the printer one sheet at a time.

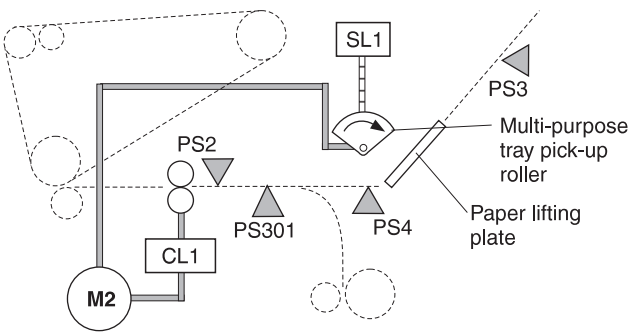


Figure 5-27 **Tray 1 manual feed**

Table 5-3 Motors, solenoids, clutches, and sensors

Reference	Description
M2	Pick-up motor
SL1	Multi-purpose tray pick-up solenoid
CL1	Registration clutch
PS2	Registration paper sensor
PS3	Last paper sensor
PS4	Multi-purpose tray paper sensor
PS301	OHT sensor

Last paper detected

The printer detects if a piece of paper is the last of the print job before writing the next image. This prevents smearing of the photosensitive drum and intermediate transfer belt.

To detect the last paper, the last paper sensor (PS3) monitors the rotation of the last paper detection roller on the multi-purpose tray. If there are two or more sheets in the multi-purpose tray, the last paper detection roller does not rotate when one sheet is picked up. Once the last paper is picked up, the last paper detection roller rotates, PS3 monitors this rotation, and a warning message is sent to the control panel.

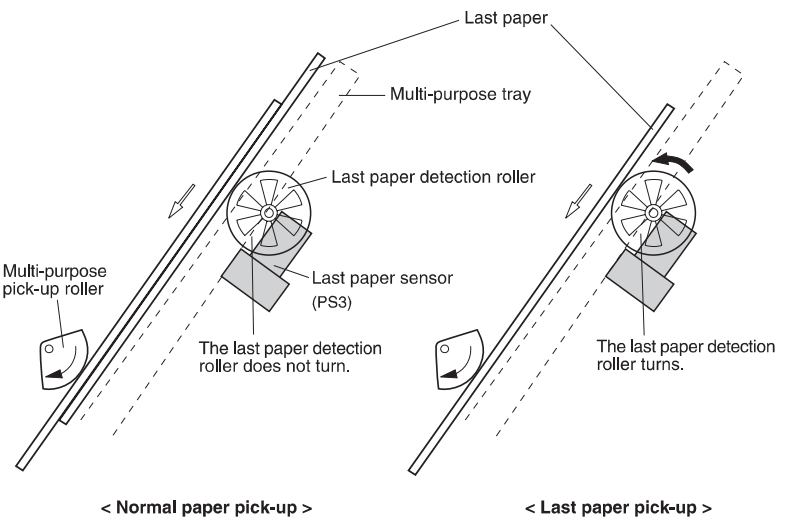


Figure 5-28 **Laser paper detected**

Overhead transparency detection

Overhead transparencies (OHT) are detected by the OHT sensor (PS301) located at the front of the registration roller. Light is emitted from PS301 and passes through the paper path, reflected by the reflective mirror, and returned to PS301. As paper passes over PS301, the light emitted from PS301 is blocked by the paper and thus does not return to PS301. Transparencies are detected when the light passes through the OHT which is reflected by the prism, and returns to the sensor. The printer is then switched to OHT mode and changes the paper path speed during transfer and fusing.

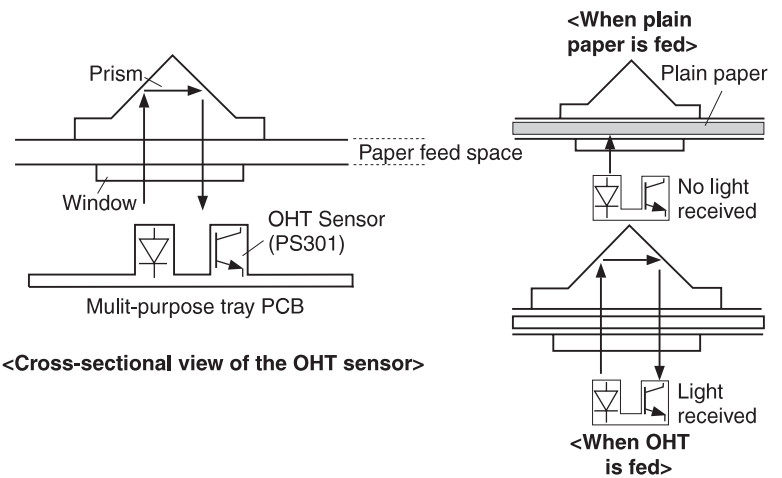


Figure 5-29 **Pick-up and feed system**

Tray 3 (500-sheet paper feeder)

Power supply

The printer supplies +24 V and +5 V to the paper feeder for power. The paper feeder is controlled by the DC controller. It does not contain a microcomputer (CPU) or a drive motor. Its rollers are controlled by the printer's pick-up motor (M2).

Pick-up and feed system

Three switches (SW3001, SW3002, and SW3003) on the paper feeder PCB detect the paper size and presence of a cassette. The DC controller activates the pick-up motor (M2) and turns on the paper feeder pick-up solenoid (SL3001) after the pick-up motor starts. The paper feeder pick-up roller is activated by the pick-up motor and

picks up the paper. Once the separation roller separates the paper from any extra sheets of paper, paper is fed into the printer by the paper feeder feed roller and printer feed roller.

The rest of the paper path is the same as the Tray 2 cassette (see Figure 5-26).

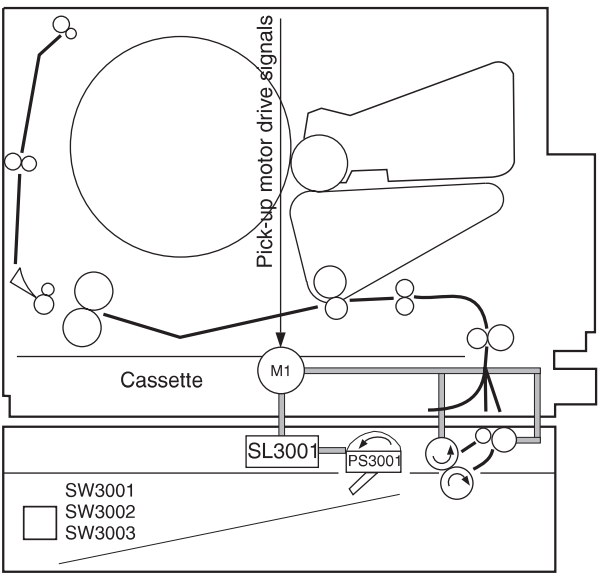


Figure 5-30 **Pick-up and feed system**

Table 5-4 Solenoids, sensors, switches

Reference	Description
SL3001	Paper feed pick-up solenoid
PS3001	Paper feed paper detection sensor
SW3001	Paper feed paper-size detection switch
SW3002	Paper feed paper-size detection switch
SW3003	Paper feed paper-size detection switch

Paper size detection

The paper size and presence of the cassette are detected by the paper size detection switches (SW801-SW803). The combinations of paper size detection switches are listed in Table 5-5.

Table 5-5 Paper size detection switches

Paper size	Cassette paper size detection switch		
	SW801	SW802	SW803
Legal	OFF	OFF	ON
A4	ON	ON	ON
Letter	OFF	ON	ON
Executive	OFF	ON	OFF
B5	ON	ON	OFF
B5-ISO	ON	OFF	OFF
A5	ON	OFF	ON
No cassette	OFF	OFF	OFF

Fusing and delivery unit

The fusing motor (M1) drives the fusing assembly, and the paper delivery rollers. Paper separated from the ITB is fed into the fusing unit, and output from the fusing unit by the upper and lower fusing rollers and fusing delivery roller. The paper output from the fusing unit is then detected by the delivery unit paper sensor (PS7).

The pressure release sensor (PS6) detects when the fusing roller pressure is off.

The printer uses a deflector to switch between the face-up bin and face-down bin. When the face-up bin is open, the paper is delivered to the face-up bin. When the face-up bin is closed, paper will be delivered to the face-down bin (see Figure 5-31).

If the face-down bin becomes full, it is detected by the face-down bin paper full sensor (PS9).

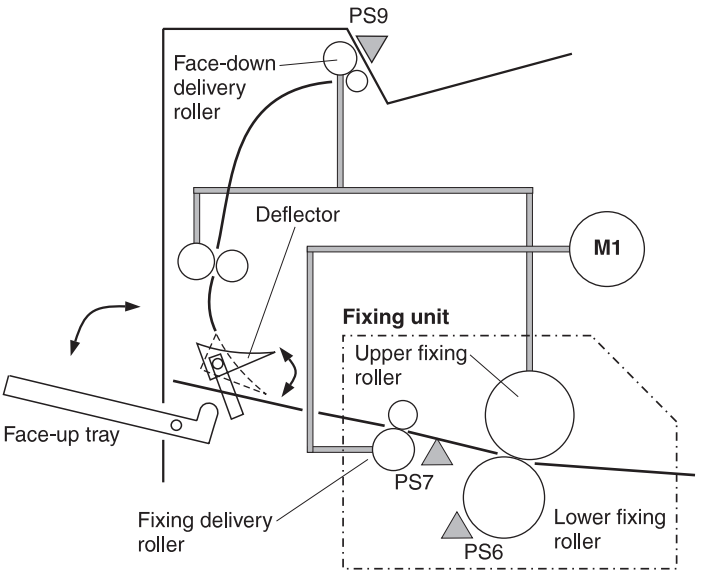


Figure 5-31 **Fusing and delivery unit**

Table 5-6 Fusing and delivery unit components

Reference	Description
M1	Fusing motor
PS6	Fusing unit pressure release sensor
PS7	Delivery unit paper sensor
PS9	Face-down tray delivery full sensor

Duplex unit paper path

Theory

The duplex printing accessory enables printing on both sides of a page. With two-sided printing, known as duplexing, the back side of the page is printed first. Then the page is sent through the duplex printing accessory, where it is flipped over and sent back through the printer for printing on the front.

Power supply

There are two power supplies for the duplexing unit: power supplied by the printer and power supplied by the internal power supply. The CPU requires +5 V of power to be supplied from the printer. This power is also used to supply power to the paper feeder. The external power supply provides +24 V and +5 V, and is used to drive the motors, solenoids, and sensors.

Operation

Paper is fed into the duplexing unit by the duplex feed rollers which are rotated by the duplex feed motor (M3101). The paper is reversed by the reversing roller, which is rotated by the reversing motor (M3102). The paper is then fed into the printer by the duplexing unit feed roller after the side registration roller is adjusted by the side registration guide (see Figure 5-32).

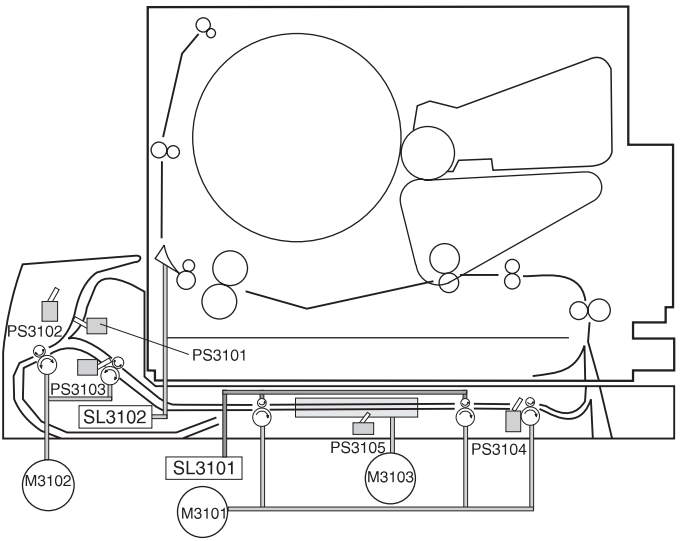


Figure 5-32 **Reversing and duplex pick-up operation**

Table 5-7 Motors, solenoids, and sensors

Reference	Description
M3101	Duplex feed motor
M3102	Reversing motor
M3103	Side registration motor
SL3101	Duplex feed roller pressure release solenoid
SL3102	Delivery deflector solenoid
PS3101	Reversing unit paper sensor
PS3102	Face-up sensor
PS3103	Reversing unit stationary paper sensor
PS3104	Duplex pick-up paper sensor
PS3105	Side registration home position sensor

Reversing operation

The print paper is guided to the duplexing unit with the face-up deflector in conjunction with the face-up tray. If the face-up tray is closed, the delivery deflector solenoid (SL3102) operates the deflector. The duplex driver PCB turns the delivery deflector solenoid (SL3102) This moves the delivery deflector feeding the paper into the duplexer. Then the reversing motor (M3102) rotates counter clockwise to feed the paper into the reversing unit.

Once the reversed paper sensor (PS3101) detects the trailing edge of the paper fed into the reversed unit, the duplex driver PCB changes the paper feed direction by rotating the reversing motor clockwise. Paper is then fed along the lower duplex guide until the paper reaches the duplex feed unit.

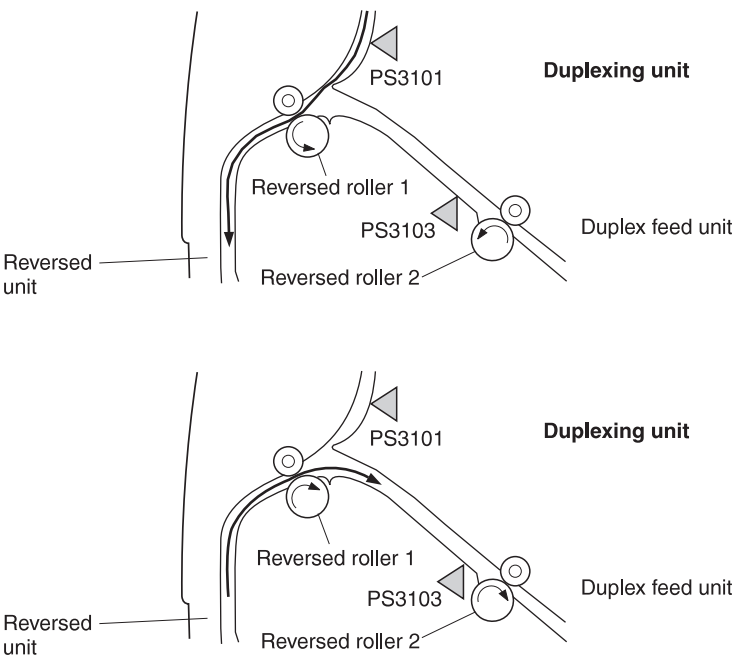


Figure 5-33 **Reversing operation**

Side registration adjustment

The printer adjusts side registration so that the center of the paper (in the horizontal direction), matches the center of the printable area on the intermediate transfer belt when printing on the second side. The side registration guides press against both sides of the paper in order to complete the adjustment.

The duplex driver PCB then drives the side registration motor (M3103) clockwise and moves the home registration guide to the home position. Once the side registration home position sensor (PS3105) detects the home position of the side registration guide, the duplex driver PCB stops M3103 and holds the side registration guide at the home position.

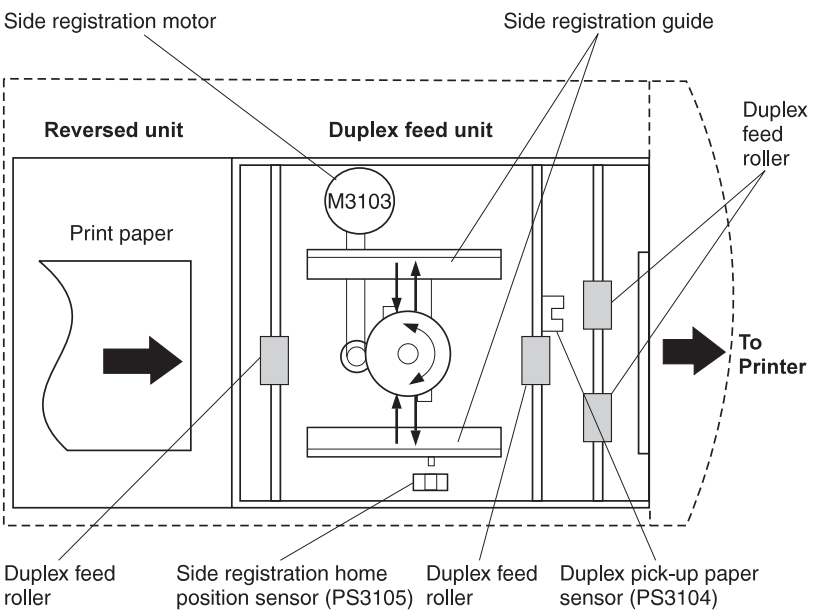


Figure 5-34 **Side registration adjustment**

When the duplexing unit stationary paper sensor (PS3103) detects paper, the paper is fed along the feed rollers.

Once the duplex pick-up sensor (PS3103) detects the paper, the paper is stopped and the paper is freed from the feed rollers.

According to the paper-size data received from the DC controller, the duplex driver runs the side registration motor (M3103) the prescribed number of pulses, moving the side registration guide and aligning the paper position. This completes the side registration of the paper process.

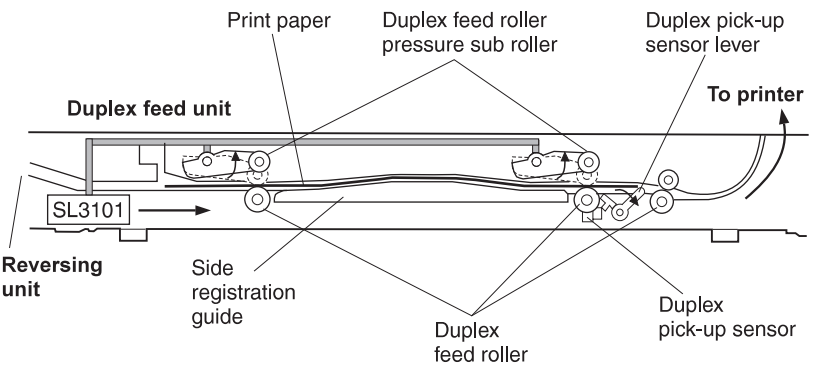


Figure 5-35 **Duplex feed roller pressure**

Duplexing unit pick-up operation

After the side registration adjustment is completed, the duplex driver sends the refed paper presence status to the printer. Once the status is reviewed by the printer, it sends the duplexing unit pick-up command to the duplex driver.

The duplex driver activates the duplex feed motor (M3101) and feeds the paper. When the paper is detected by the registration paper sensor (PS2), the duplex driver deactivates M3101, stopping the paper feed process. The duplex driver then activates M3101 to resume feeding once it receives the refeed command. Once the media is in position, the duplex driver will deactivate M3101 and stop the duplex feed roller. After the second side of paper is printed, the paper is fed to the face-down delivery bin.

DC controller subsystem

The DC controller is responsible for coordinating the entire printing process. The DC controller enables the drive circuitry for the laser beam and coordinates print data from the formatter with paper size, laser beam motion, the high voltage system, fuser temperature, and motors. The DC controller also shares machine status information with the formatter so that proper diagnostic messages are displayed on the control panel. An overview is shown in Figure 5-36.

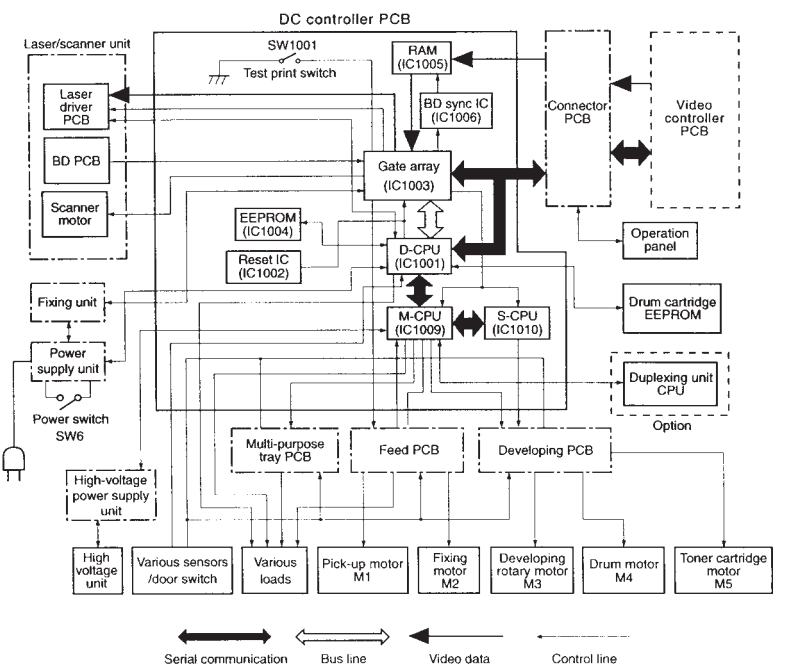


Figure 5-36 **DC controller PCB**

Motors and fans

The printer contains five motors that drive the paper pick-up/feed assembly and the image formation assembly. The printer also contains three fans which cool the motors. Figure 5-37 and Table 5-8 illustrate and describe the function and location of each.

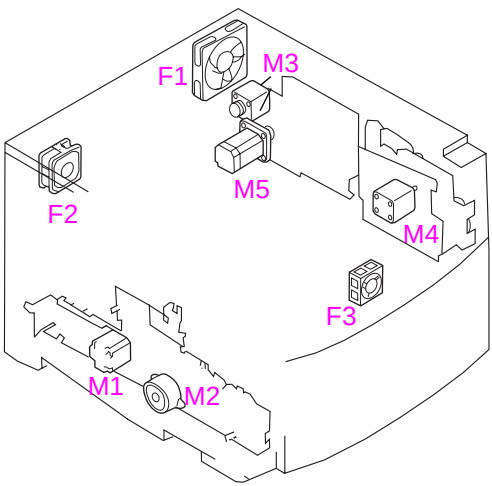


Figure 5-37 **Motors and fans**

Table 5-8 Motor and fan locations

Reference	Components
M1	Fusing motor
M2	Pick-up motor
M3	Carousel motor
M4	Drum motor
M5	Toner cartridge motor
F1	Large fan
F2	Small fan
F3	Front fan

Fusing motor (M1)

The fusing motor is a two-phase stepping motor. This motor operates the fusing assembly secondary transfer roller, feed belt, feed roller, ITB contact clutch, ITB cleaning roller contact clutch, and the secondary transfer contact clutch.

Pickup motor (M2)

The pick-up motor is a two-phase stepping motor. The pick-up motor operates the cassette, multi-purpose tray, paper feeder, and registration roller.

Carousel motor (M3)

The carousel motor is a two-phase stepping motor. The carousel motor operates the toner carousel.

Drum motor (M4)

The drum motor is a two-phase stepping motor. The drum motor operates the intermediate transfer belt (ITB) and the photosensitive drum cartridge and its related components.

Toner cartridge motor (M5)

The toner cartridge motor is a two-phase stepping motor. The toner cartridge motor operates the developer sleeve in the toner cartridge and performs the toner contact/separation function.

Fan motor

The fan motor is a DC brushless motor containing a hall element and the motor driver circuit. The printer has two exhaust fans (F1 and F2) and one inducting fan (F3). The three fans are used to ensure correct airflow through the printer.

Formatter system

The formatter PCB is responsible for the following:

- Receiving and processing print data from the various printer interfaces
- Monitoring control panel inputs and relaying printer status information (through the control panel and the bidirectional I/O)
- Developing and coordinating data placement and timing with the print engine
- Storing font information
- Communicating with the host computer through the bidirectional interface
- Controlling the PowerSave mode

The formatter PCB receives a print job from the bidirectional interface and separates it into image information and instructions which control the printing process. The DC controller PCB synchronizes the image formation system with the paper input and output systems, and then signals the formatter to send the print image data.

The formatter PCB also provides the electrical interface and mounting locations for two EIO cards and additional memory DIMMs.

Control panel

The Formatter PCB sends and receives printer status and command data via a control panel PCB. If you replace the formatter PCB, updates will be sent to the DC controller PCB and vice-versa.

CAUTION Never replace both the Formatter PCB and the DC controller PCB at the same time.

Power supplies

Power supply overview

There are three power supplies used to power various sections of this printer. There is an AC/DC power supply and a High voltage power supply. See Chapter 6 for instructions on accessing the power supplies.

AC/DC power supply

The low-voltage power supply circuit supplies +24VDC and +5VDC required for the printer and 3.3 and 5 VDC required for the video controller.

+24 VDC is supplied for the paper pick up motor, scanner motor, and the high-voltage power supply PCB. +5 VDC is supplied for the sensors and the ICs on the DC controller PCB.

The front door switch or the rear door switch is deactivated by opening the drum cartridge drawer, ITB unit drawer, toner cartridge door, or delivery door. These switches are in series and disable the 24 VDC when open.

The low-voltage power supply circuit monitors the 5 VS (volt signal) fed back from the connector PCB to ensure the 5 V power supply to the formatter.

Overcurrent overvoltage protection

Each DC power supply circuit has an overcurrent protective function and overvoltage protective function. This will prevent a power supply circuit failure by automatically interrupting the output voltage when anomalies such as a short develops on the loads that result in overcurrent flow or abnormal voltage.

If this function is activated and no DC voltage is output from the low-voltage power supply circuit, turn OFF the power switch (SW6), unplug the power cord, resolve the anomaly on the load, and then turn ON the power switch (SW6) again.

Note Protective functions remain active for 2 minutes after activation. Wait for at least 2 minutes to turn the power back on again.

High-voltage power supply

The printer contains two high-voltage PCBs mounted in one assembly. Together these PCBs generate the voltage supplied to the primary charging roller, developing sleeve, primary transfer roller, secondary transfer roller, ITB cleaning roller, and upper fusing roller. DC voltage or a superimposed AC voltage and DC voltage is applied to the primary charging roller, developing sleeve, and ITB cleaning roller. Positive or negative DC voltage is applied to the primary transfer roller and secondary transfer roller. Negative DC voltage is applied to the upper fusing roller.

6 Removal and replacement

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Overview

This chapter discusses the following topics:

- Introduction
- Consumable assembly
- Covers, drawers, top, and front assemblies
- Right side assemblies
- Left side assemblies
- Rear assemblies
- Internal assemblies

Introduction

Removal and replacement strategy

This chapter explains how to remove and replace major printer components. (HP does not support repairing individual subassemblies or troubleshooting to the component level.)

Replacement is generally the reverse of removal. Occasionally, directions for difficult or critical replacement procedures are included.

Repair notices

WARNING! Turn the printer off and unplug the power cord before servicing the printer. Failure to follow this instruction could result in severe injury.

Never operate or service the printer with the protective cover removed from the scanner assembly. The reflected beam, although invisible, can damage your eyes.

Never operate the printer with any parts removed.

The sheet-metal parts can have sharp edges. Be careful not to cut yourself when handling sheet-metal parts.

CAUTION Always protect the imaging drum from light and physical contact when it is removed from the printer. HP recommends reinstalling the original cover whenever the drum is removed from the printer.

Caution regarding electrostatic discharge (ESD)

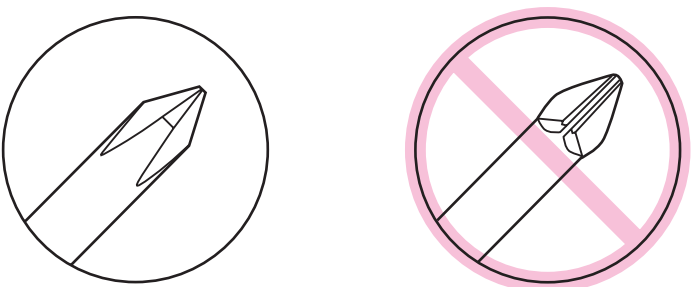
The printer contains parts that are sensitive to electrostatic discharge (ESD). Watch for the ESD reminder shown at the left when removing printer parts. Protect the parts that are sensitive to ESD with protective ESD pouches.

Required tools

The following tools are needed to service the printer:

- Phillips #2 magnetized screwdriver (6-inch [152-mm] shaft) may be used in place of a Phillips #1 screwdriver
- Small flat-blade screwdriver
- Small needle-nose pliers
- ESD strap
- Penlight (optional)

All components in the HP Color LaserJet 4500 printer use Phillips-head screws that require a #1 or #2 Phillips screwdriver. Ensure that you have a Phillips screwdriver and not a Posidriv screwdriver. Figure 6-1 (below) shows the difference between a Phillips and a Posidriv screwdriver. Note that the Phillips tip has more beveled surfaces.



Phillips Posidriv

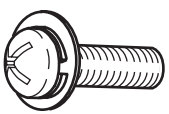
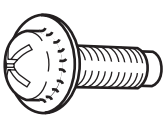
Figure 6-1 **Phillips vs. Posidriv Screwdrivers**

Types of screws

Table 6-1 describes the screws used in the printer and provides guidelines to help determine where each type of screw is used. The screws can vary in length depending on the thickness of the material being fastened.

Always note where each type of screw is located and replace each one into its original location.

Table 6-1. Types of screws

Illustration	Description	Uses
	Screw, machine w/Washer	To hold plastic to metal. example: the skins
	Screw, self tapping	To hold plastic to plastic. example: control panel
	Screw, trus head	To hold sheet metal to sheet metal. example: formatter pan
	Retaining Ring (e-type)	

Consumable assembly

The user replaces consumable assemblies as part of periodic maintenance. Chapter 4 explains the maintenance procedures.

Note The printer tracks the amount of use on some of its user-replaceable parts by keeping a page count. Swapping consumable assemblies between printers might cause a misrepresentation of consumable assembly life values and is not recommended.

Top cover

To remove the top cover

1. Pull open the upper front drawer until it clears the top cover.
2. Push the release button on the left side of the printer and open the top cover door.
3. Open the rear door of the printer.
4. Remove the two screws from the top cover as shown in Figure 6-2.
5. Lift up on the rear corners of the top cover to release the plastic retaining tabs from the side cover.
6. Rotate the back of the cover towards the left side of the printer, then lift to remove cover.

Top cover replacement tip

- When replacing the top cover, be sure to properly seat the two plastic retaining tabs on the front of the cover.

Figure 6-2 **Top cover removal and replacement**

Left side cover

To remove the left side cover

1. Remove the top cover.
2. Remove the two screws as shown in Figure 6-3.
3. While pulling out on the bottom of the cover, release the tab. Then lift the cover up and off.

Note The tab is located below the small fan and behind the strap mounting location.

Figure 6-3 **Left side cover removal and replacement**

Right side cover

To remove the right side cover from the printer

1. Remove the top cover.
2. Remove the two screws as shown in Figure 6-4.
3. While pulling out on the bottom of the cover, gently work the cover back and up until it comes off.

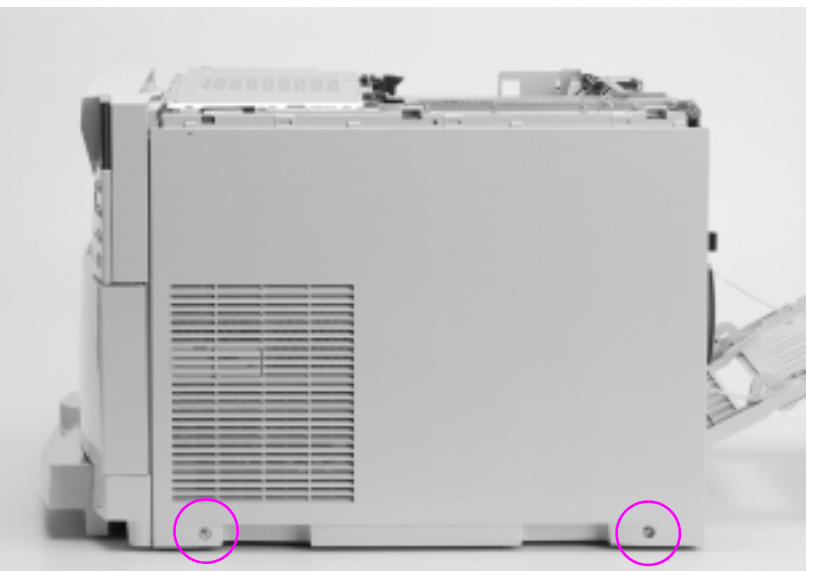


Figure 6-4 **Right side cover removal and replacement**

Rear door cover

To remove the rear door cover

1. Open the rear door of the printer.
2. Push in the retaining strap connectors to release the two plastic retaining straps attached to the inside of the rear door as shown in Figure 6-5.
3. Slide the bottom of the rear door to the left until the lower right plastic guide-pin clears the guide-pin harness attached to the printer.
4. Remove the rear door.

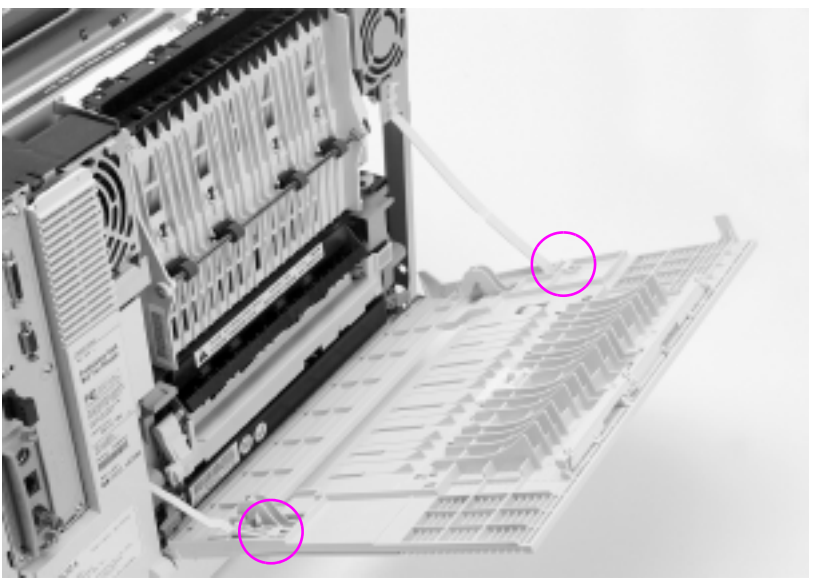


Figure 6-5 **Rear door removal and replacement**

Right side rear cover

To remove the right side rear cover

1. Remove the top cover.
2. Remove the right side cover.
3. Remove the screw as shown in Figure 6-6.
4. Rotate the top of the cover towards the left side of the printer and remove the cover.

right side rear cover replacement tip

Note

Ensure that the lip on the lower left side of the cover slides behind the right side of the lower rear cover.

Figure 6-6 **Right side rear cover removal and replacement**

Upper front drawer cover

To remove the upper front drawer cover

1. Open the front upper drawer until it stops.
2. Remove the four black screws from the inside of the drawer cover as shown in Figure 6-7.
3. Remove the two metal braces held in place by the upper screws.
4. Tilt the top of the cover away from the upper drawer and carefully release the two black plastic retaining tabs from the two black plastic levers (Figure 6-8).
5. Slide the cover down to release the plastic retaining tabs connected to the front underside of the upper front drawer. Lower the cover and remove.

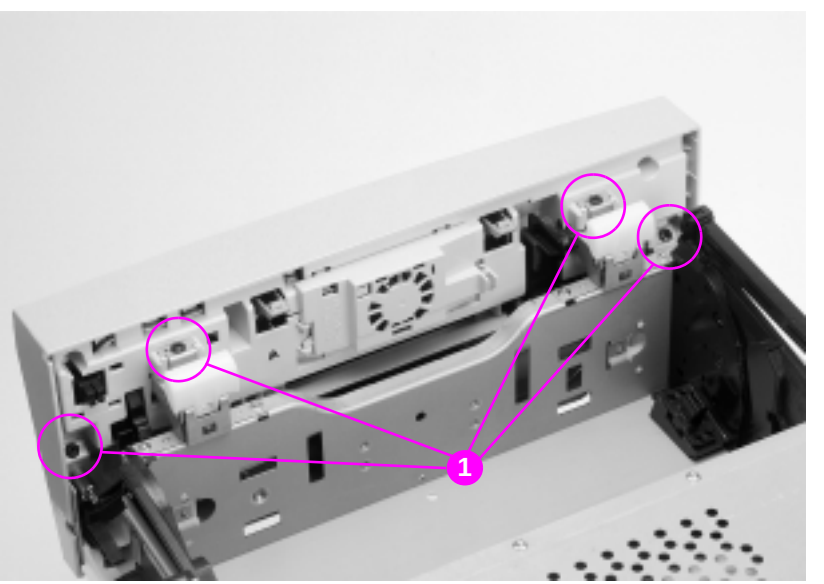


Figure 6-7 **Upper front drawer cover removal and replacement**

Upper front drawer cover replacement tip

- When replacing the upper front drawer cover, carefully insert the black plastic tabs into the black plastic levers (Figure 6-8).

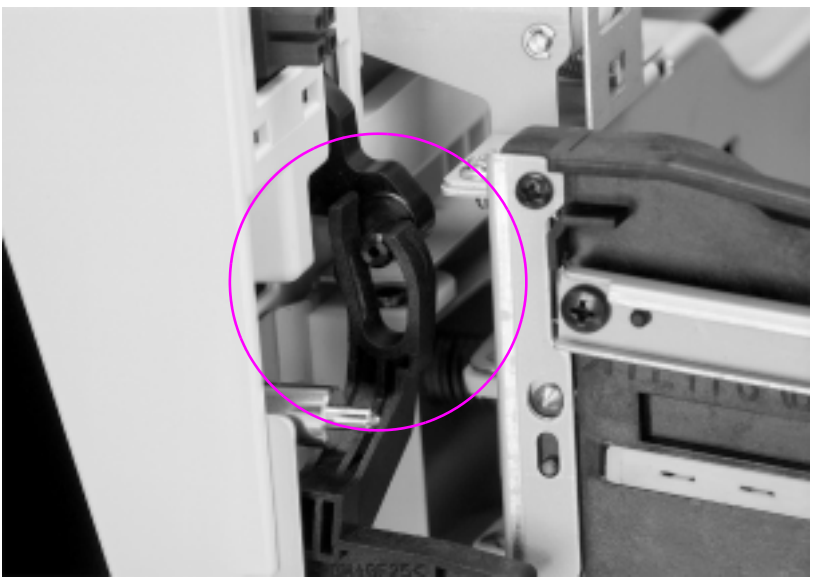


Figure 6-8 **Upper front drawer cover tabs and levers**

Middle front drawer cover

To remove the middle front drawer cover

1 Remove the two screws in the top of the middle front drawer cover as shown in Figure 6-9.

2 Lift up on the cover. Tilt it forward and then down to clear the two plastic retaining tabs located in the lower middle of the cover and remove the cover.

Middle front drawer cover replacement tip

- Replace the two plastic retaining tabs correctly.

Figure 6-9 **Middle front drawer cover removal and replacement**

Control panel

To remove the control panel

1. Open the middle front drawer.
2. Remove the black self-tapping screw as shown in Figure 6-10.
3. Pull the bottom of the control panel out to clear the tab.
4. Lift the control panel up to remove it.
5. Disconnect the cable.

Figure 6-10 **Control panel removal and replacement**

Front right cover

To remove the front right cover

1. Remove Tray 2.
2. Remove the control panel.
3. Open the upper front drawer to the stops.
4. Remove the three screws as shown in Figure 6-11 (callout 1).
5. Using a small flat-blade screwdriver, release the two plastic tabs (callout 2).
6. Remove the cover.

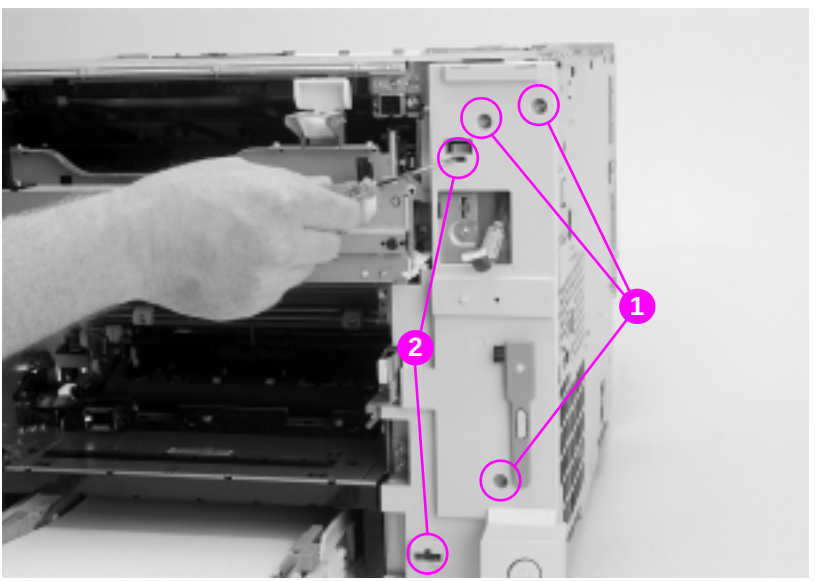


Figure 6-11 **Front right cover removal and replacement**

Middle front drawer

To remove the middle front drawer

1. Pull the middle front drawer completely out until it stops.
2. Remove the intermediate transfer belt (ITB).
3. Lift up on the drawer, clearing the first set of guide wheels from the guide rail (Figure 6-12). Pull the guide rails until the next set of guide rail wheels stop, and then lift to clear the second set of guide wheels from the guide rails.

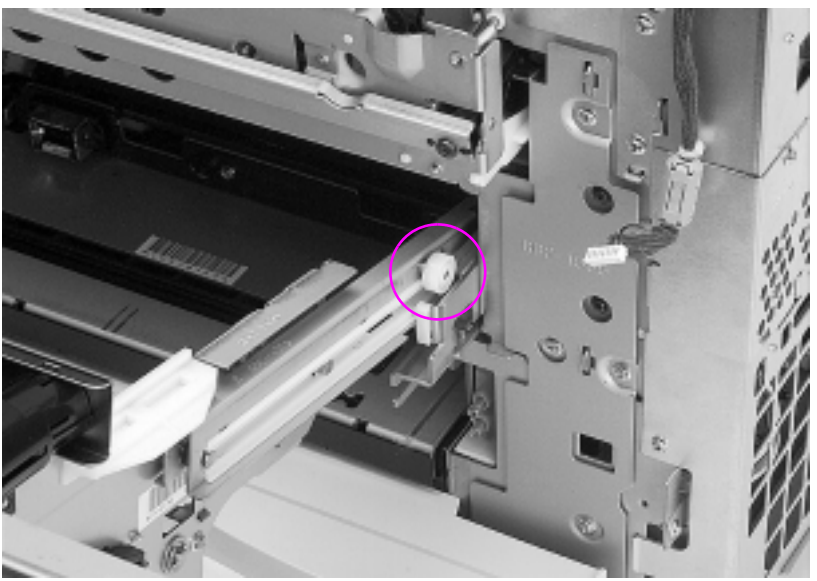


Figure 6-12 **Middle front drawer removal and replacement**

Radio Frequency Interference (RFI) shield

To remove the RFI shield

1. Remove the top cover.
2. Remove the left side cover.
3. Remove the 13 screws shown in Figure 6-13.
4. Lift up on the RFI shield and remove.

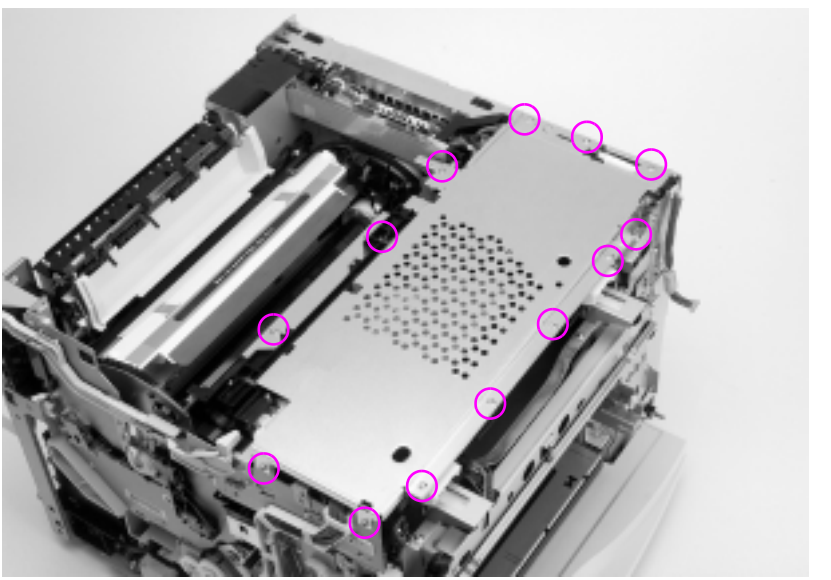


Figure 6-13 **RFI removal and replacement**

Laser/scanner assembly

To remove the laser/scanner assembly

1. Remove the top cover.
2. Remove the left side cover.
3. Remove the RFI shield.
4. Disconnect connector J1006 from the DC Controller.
5. Free the cable harness from the cable stays.
6. Disconnect the flat ribbon cable.
7. Disconnect the cable from the laser/scanner PCB.
8. Remove the four screws shown in Figure 6-14.
9. Tilt the front of the laser/scanner assembly up and remove.

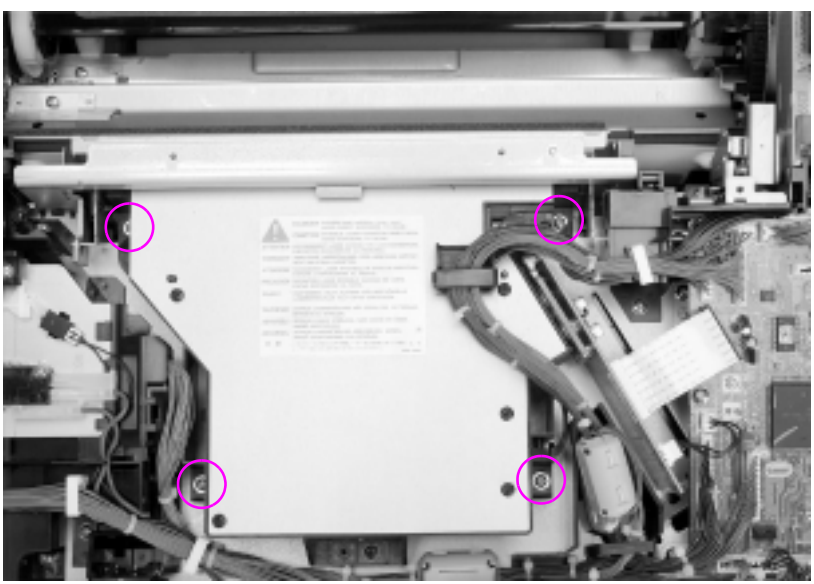


Figure 6-14 **Laser/scanner assembly removal and replacement**

DC controller

To remove the DC controller

1. Remove the top cover.
2. Remove the left side cover.
3. Remove the RFI shield.
4. Disconnect all connectors from the DC controller.
5. Remove the five screws from the DC controller shown in Figure 6-15.
6. Lift the DC controller up and out to remove.

DC controller replacement tip

- The connectors are keyed and will fit in only one slot.

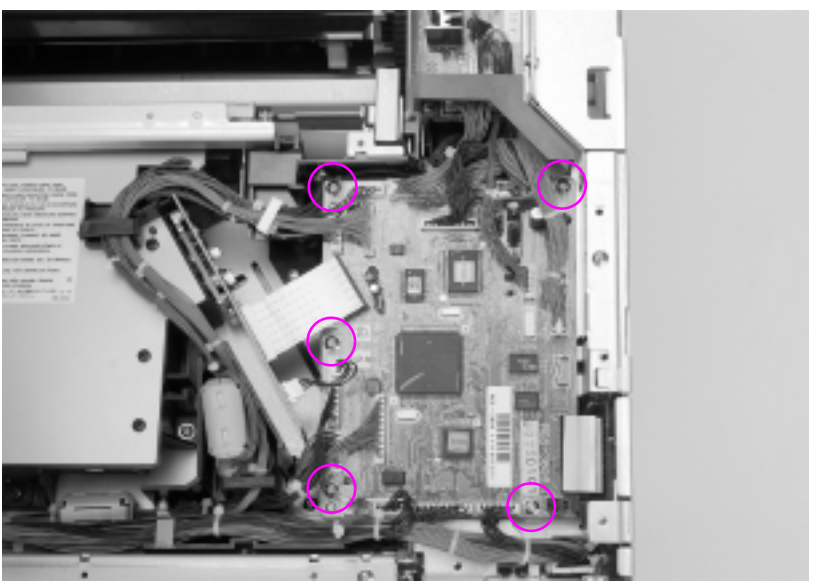


Figure 6-15 **DC controller removal and replacement**

Developing PCB

To remove the developing PCB

1. Remove the top cover.
2. Remove the left side cover.
3. Remove the RFI shield.
4. Remove the black plastic shield shown in Figure 6-16 (callout 1) by lifting the two tabs shown (callout 2). Lift up on the shield to remove it.

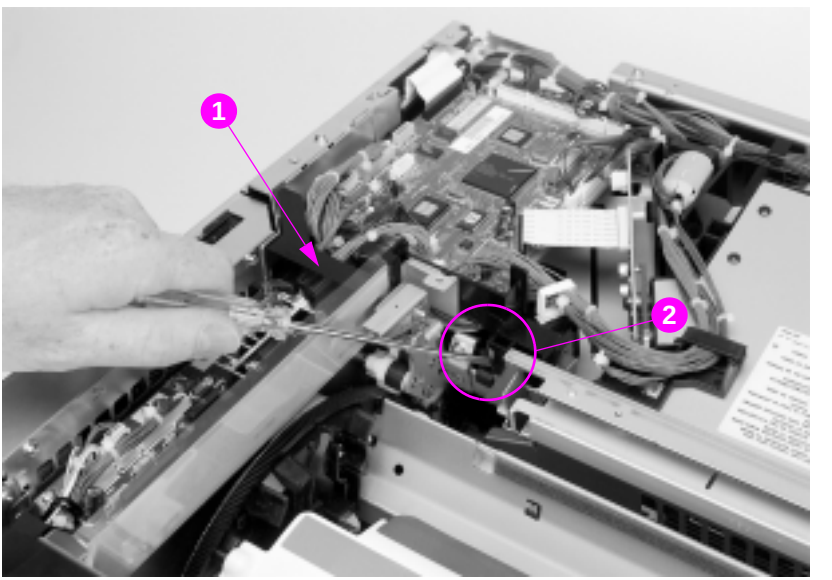


Figure 6-16 **Developing board removal and replacement (1 of 2)**

5. Disconnect the connectors from the developing PCB.

6 Remove the five screws from the developing PCB as shown in Figure 6-17 (callout 1).

7 Lift the board up and out.

Developing board replacement tip

- When securing the motor board with the five screws, secure the metal cable stay (callout 2) at the location shown.

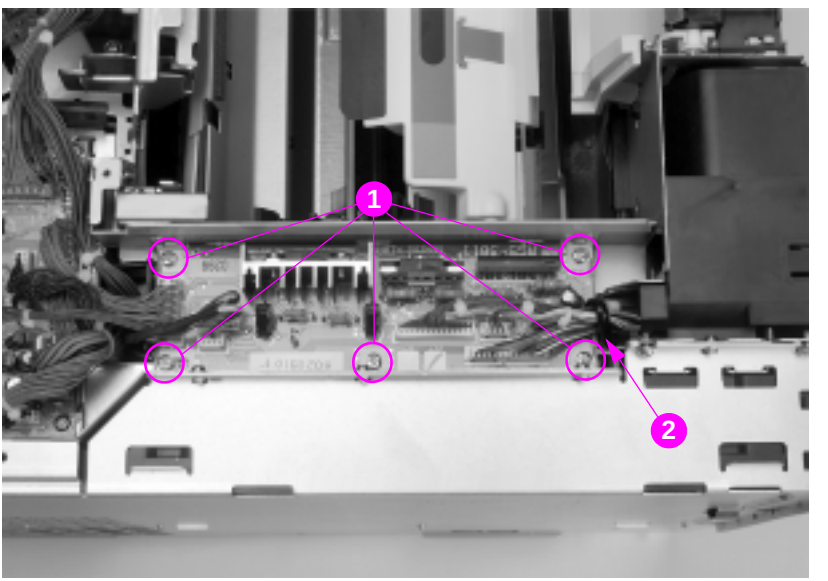


Figure 6-17 **Developing board removal and replacement (2 of 2)**

Top door switch assembly

To remove the top door switch assembly

1. Remove the top cover.
2. Remove the left side cover.
3. Remove the RFI shield.
4. Disconnect the sensor and switch cables from the top door switch assembly as shown in Figure 6-18 (callout 1).
5. Free the sensor and switch cables from their cable stays.
6. Remove the two screws from the top door switch assembly (callout 2).
7. Slide the assembly to the left then lift the assembly up and out.

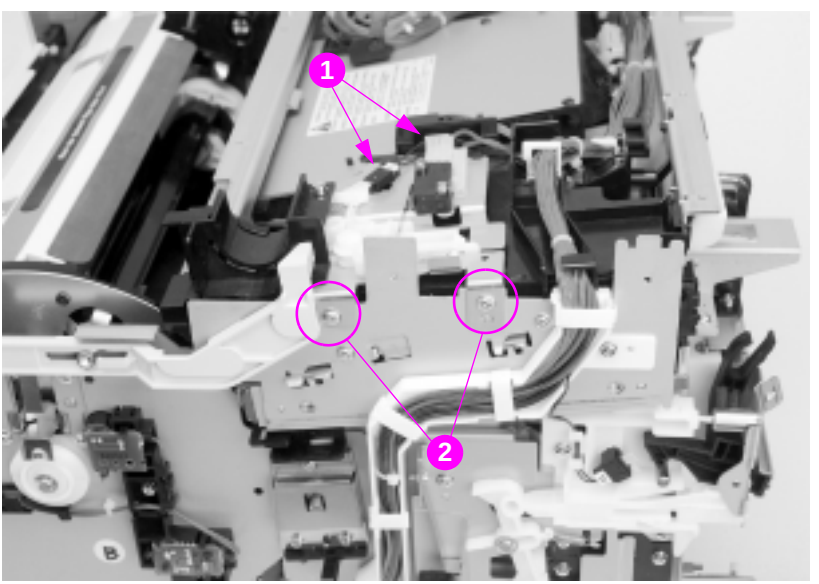


Figure 6-18 **Top door switch assembly removal and replacement**

Upper front drawer assembly

To remove the upper front drawer

1 Remove the top cover.

2 Remove the left side cover.

3 Remove the RFI shield.

4 Remove the top drawer switch assembly.

5 Disconnect connectors J1004 and J1010 on the DC controller.

6 Disconnect the top drawer switch (see Figure 6-19).

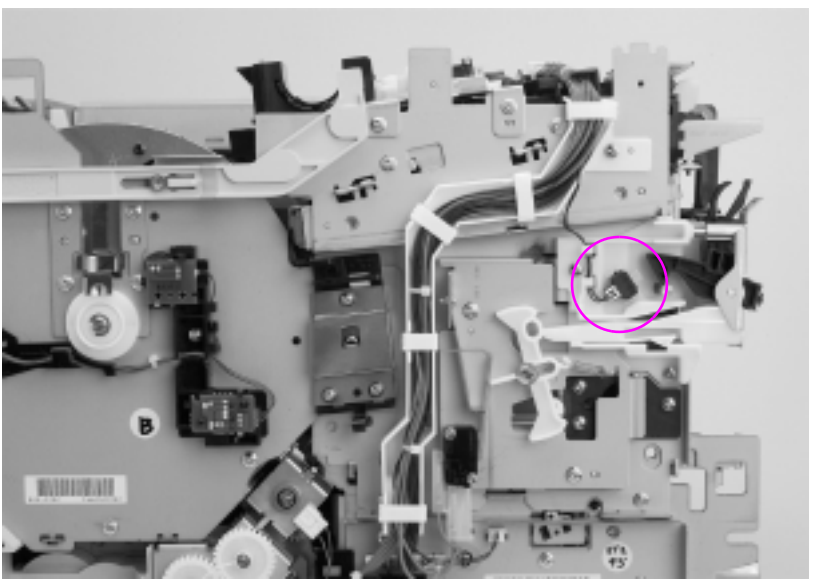


Figure 6-19 **Top drawer switch**

7 Remove the cables from the cable stays and push the cables back toward the rear of the printer.

Note To prohibit damage, protect the drum from direct light at all times.

8 Open the upper front drawer until it stops and remove the drum cartridge.

9 Remove the two screws from the black plastic housing shown in Figure 6-20.

10 Lift the black plastic housing and slide it forward onto the front drawer.

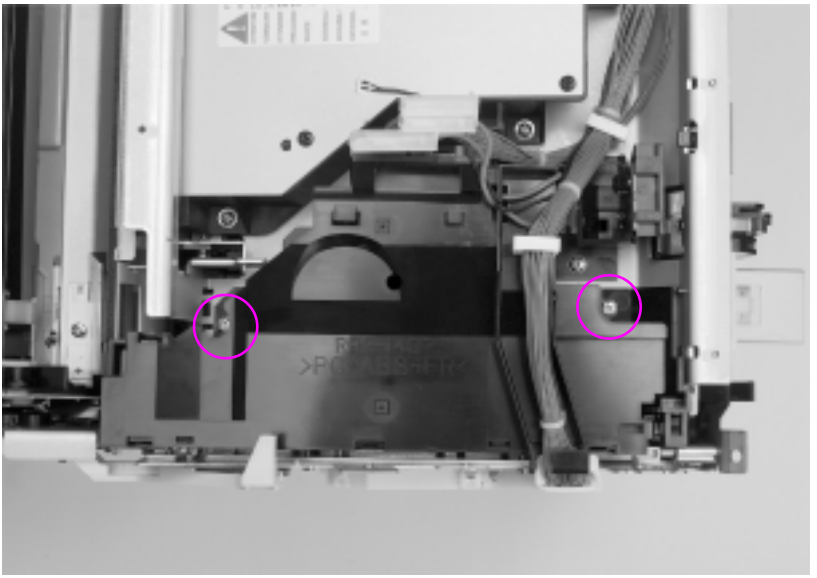


Figure 6-20 **Upper front drawer assembly removal and replacement (1 of 2)**

11 Use a small, flat-blade screwdriver to lift the tabs shown in Figure 6-21 inside the drum drawer guide rails while pulling each side of the drawer until it is free.

12 Pull the upper front drawer out and away from the printer.

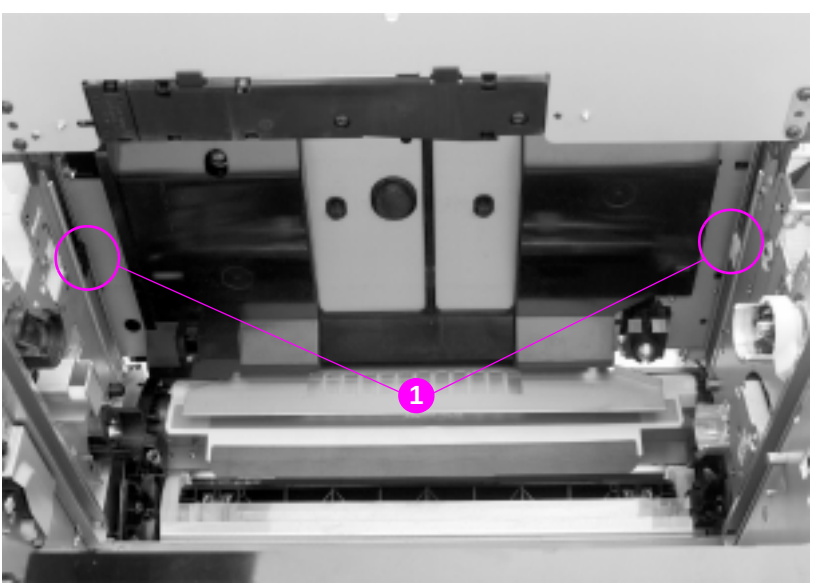


Figure 6-21 **Upper front drawer assembly removal and replacement (2 of 2)**

Densitometer assembly

To remove the densitometer

1. Open the upper front drawer and remove the drum cartridge.
2. Remove the two screws on the densitometer as shown in Figure 6-22 (callout 1).
3. Use a small, flat-blade screwdriver to release the tab shown (callout 2) and remove the metal shield over the densitometer.

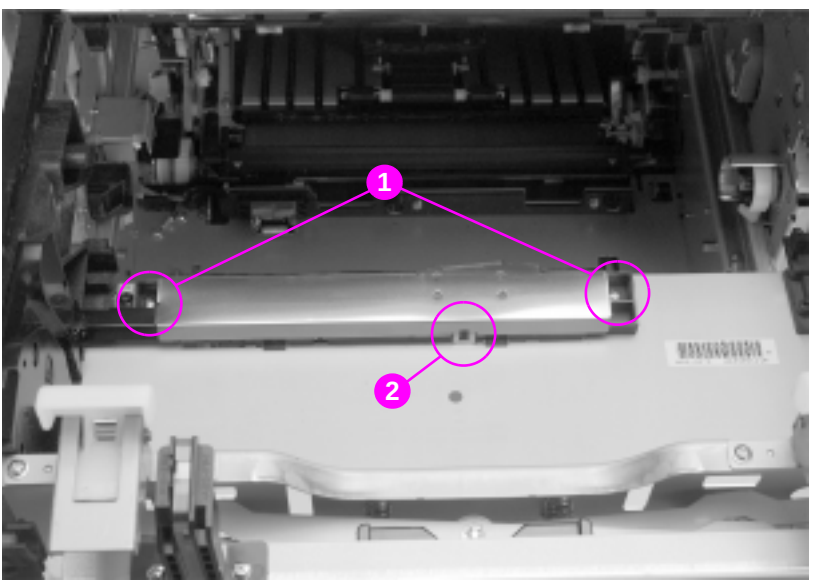


Figure 6-22 **Densitometer removal and replacement (1 of 2)**

4 Remove the plastic cover as shown in Figure 6-23.

5 Disconnect the connector from the densitometer and remove the cable from the cable stays.

6 Remove the densitometer by sliding it toward the rear of the printer.

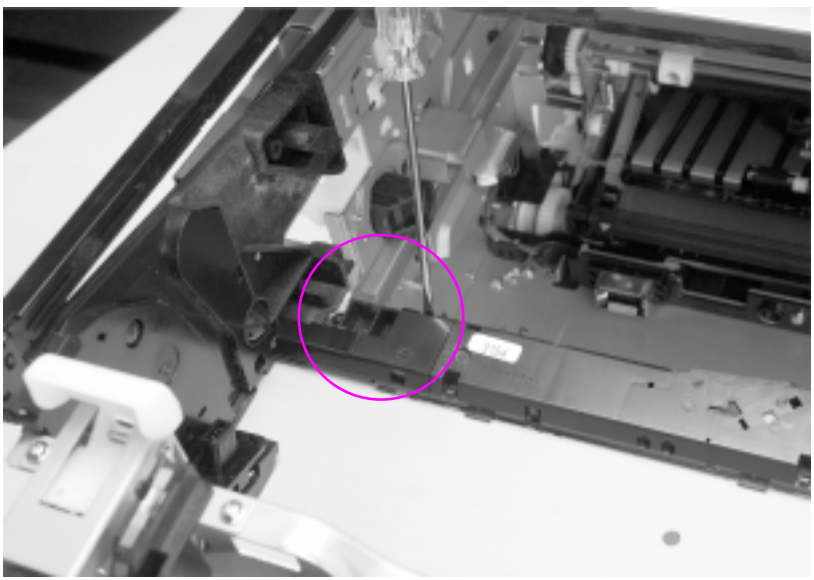


Figure 6-23 **Densitometer removal and replacement (2 of 2)**

Formatter

To remove the formatter

1 Power off the printer.

2 When the fans are turned off, unplug the printer.

CAUTION Power is applied to the printer fans while plugged-in. Power is applied to the formatter while the fans are running. Removing the formatter while power is applied to the printer may damage the formatter.

3 Remove the six screws in the formatter as shown in Figure 6-24.

4 Slide the formatter out of the rear of the printer.

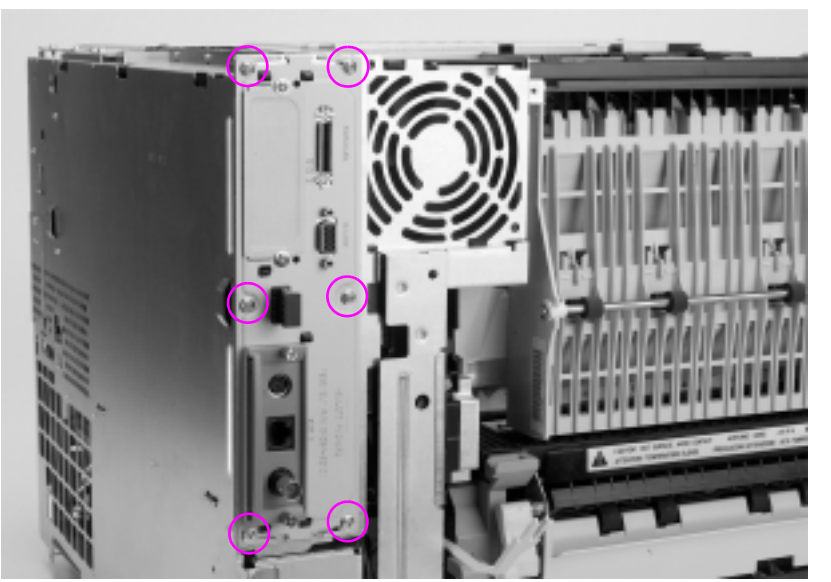


Figure 6-24 **Formatter removal and replacement**

Formatter pan assembly

To remove the formatter pan assembly

1. Remove the top cover.
2. Remove the right side cover.
3. Remove the right rear cover.
4. Remove the control panel.
5. Remove the Front right cover.
6. Remove the two screws for the connector cover shown in Figure 6-25.

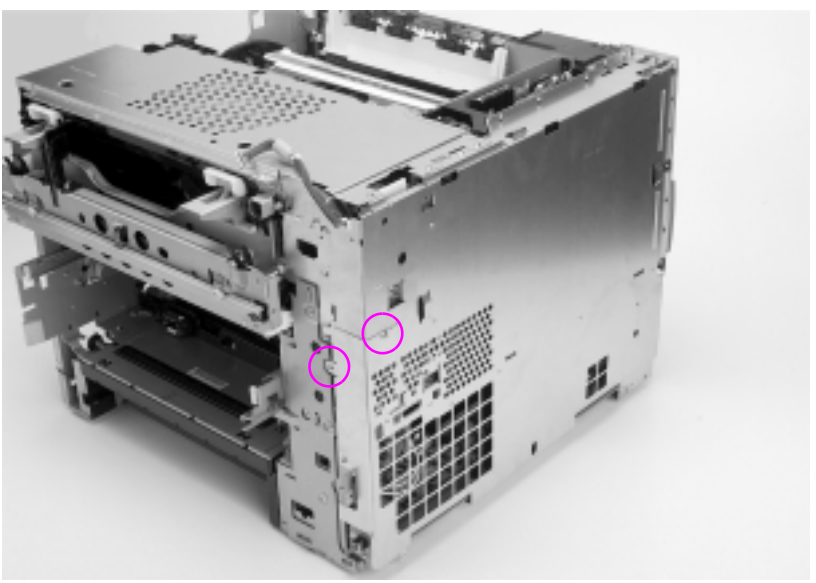


Figure 6-25 **Formatter pan assembly removal and replacement (1 of 4)**

7 Disconnect the two connectors shown in Figure 6-26 (callout 1).

Note A small, flat-blade screwdriver should be used to release the top connector by pressing on the latch.

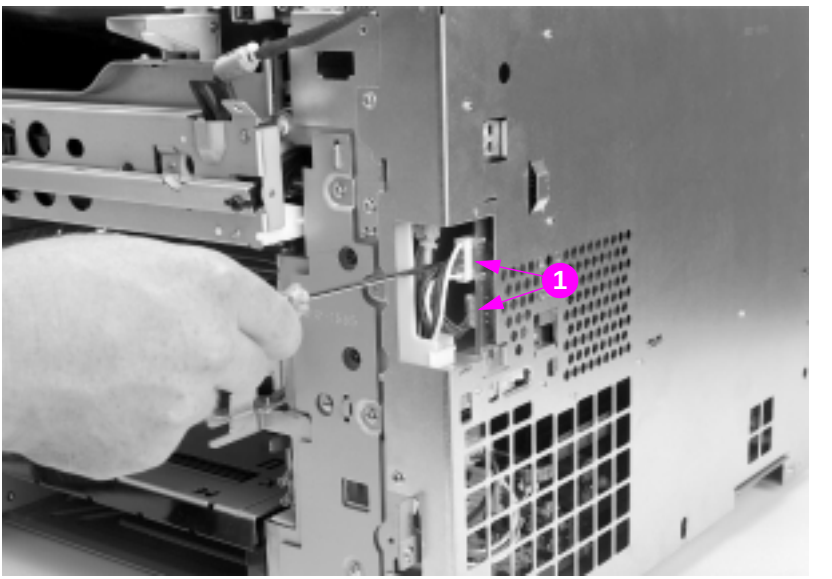


Figure 6-26 **Formatter pan assembly removal and replacement (2 of 4)**

8 Disconnect the ribbon cable from the DC controller as shown in Figure 6-27.

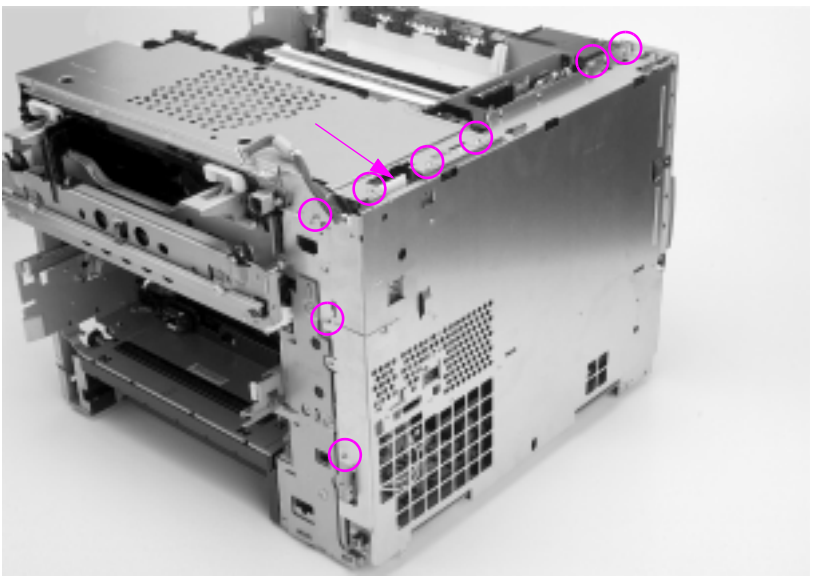


Figure 6-27 **Formatter pan assembly removal and replacement (3 of 4)**

9 Remove the control panel cable from its cable stay.

10 Remove the 12 screws from the formatter pan assembly as shown in Figure 6-27 and Figure 6-28.

11 Remove the formatter pan assembly by pulling the bottom out then lifting up.

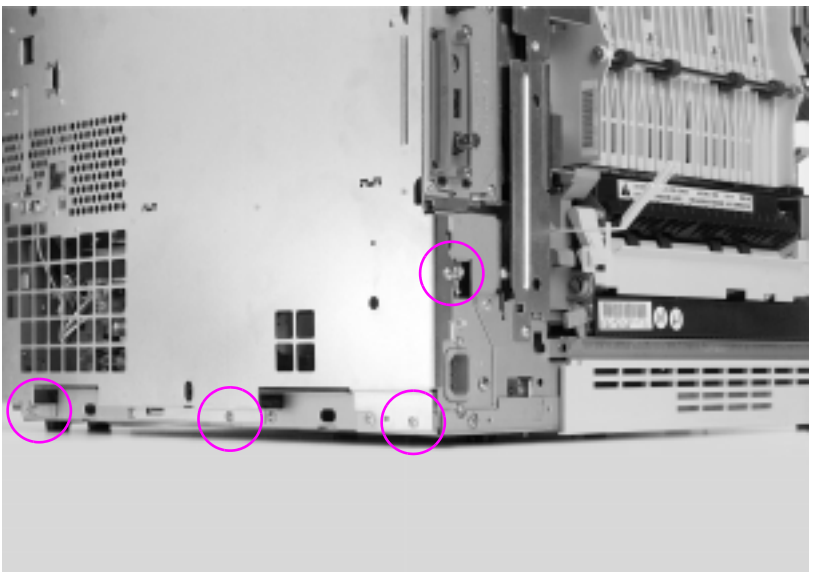


Figure 6-28 **Formatter pan assembly removal and replacement (4 of 4)**

Power supply

To remove the power supply

1 Remove the formatter pan assembly.

1 Disconnect the four connectors from the power supply.

2 Free the cable harness from the cable stay.

3 Remove the seven screws from the power supply shown in Figure 6-29.

4 Slide the power supply forward slightly to clear the rear retaining tab and tilt the top of the assembly out. Lift power supply up and out.

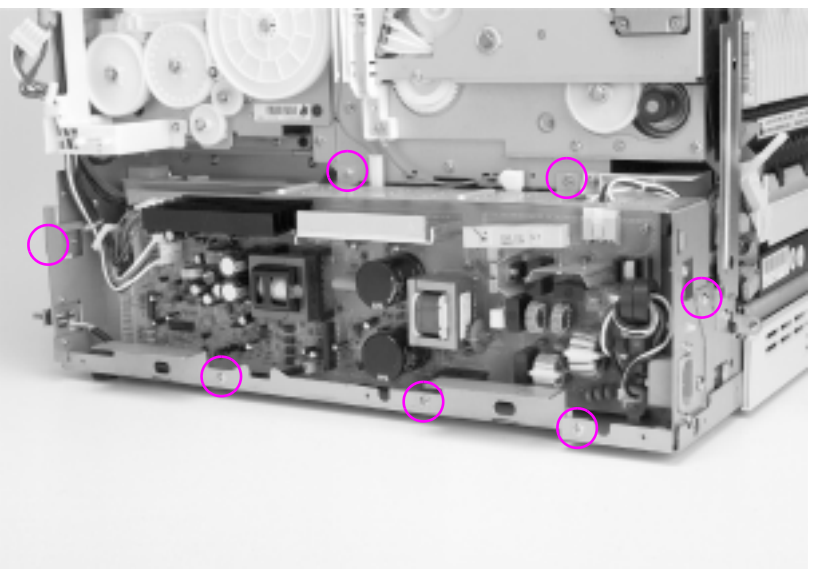


Figure 6-29 **Power supply removal and replacement**

High-voltage power supply

To remove the high-voltage power supply

1. Remove the formatter pan assembly.
2. Remove the power supply.
3. Remove the rear door cover.
4. Remove the fusing assembly.
5. Disconnect the four cables from their connectors.
6. Free the cable harness from the cable stay.
7. Remove the four screws shown in Figure 6-30 from the high-voltage power supply (HVPS).
8. Carefully pull the HVPS out. Ensure that the rear plastic retaining strap attached to the HVPS clears the chassis and its remaining components.

High-voltage power supply replacement tip

Note When reinstalling the HVPS, carefully insert the plastic retaining strap attached to the rear of the HVPS through the chassis.

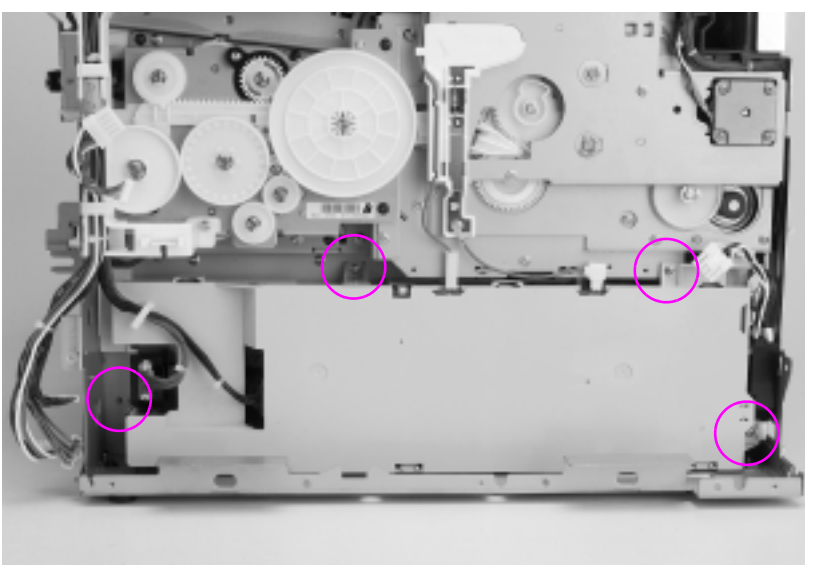


Figure 6-30 **High voltage power supply removal and replacement**

Drum drive assembly

To remove the drum drive assembly

1. Remove the formatter pan assembly.
2. Remove the power supply.
3. Disconnect the two cables from the HVPS and free them from the cable stay.
4. Remove the screw that secures the cable trough to the drum drive assembly as shown in Figure 6-31.

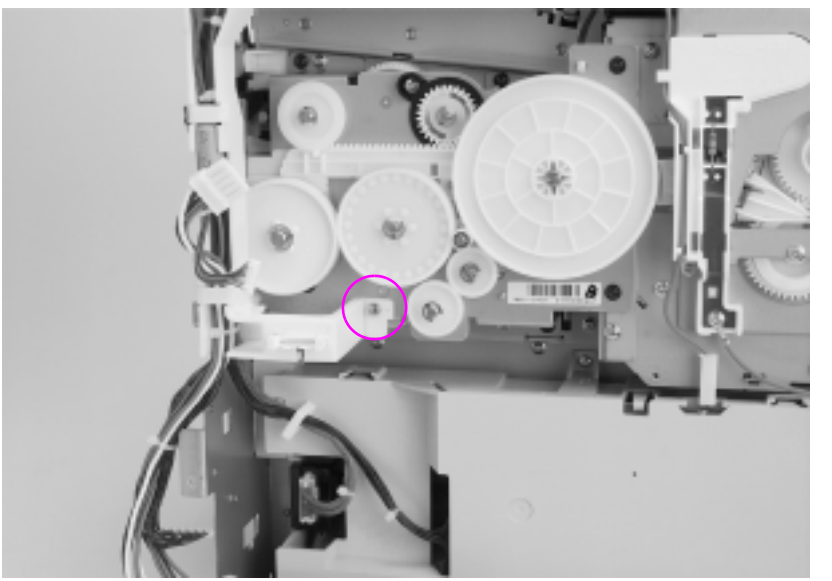


Figure 6-31 **Drum drive assembly removal and replacement (1 of 3)**

5. Carefully release the cable trough by pulling out slightly on the bottom and releasing the clip. Slide the trough toward the rear of the printer until it is free.
6. Disconnect J204 on the developing PCB and free it from its cable stay.
7. Remove the eight black screws from the drum drive assembly shown in Figures 6-32 and 6-33.
8. Ensuring that both front drawers are open, gently slide the drum drive assembly straight out from the printer assembly.

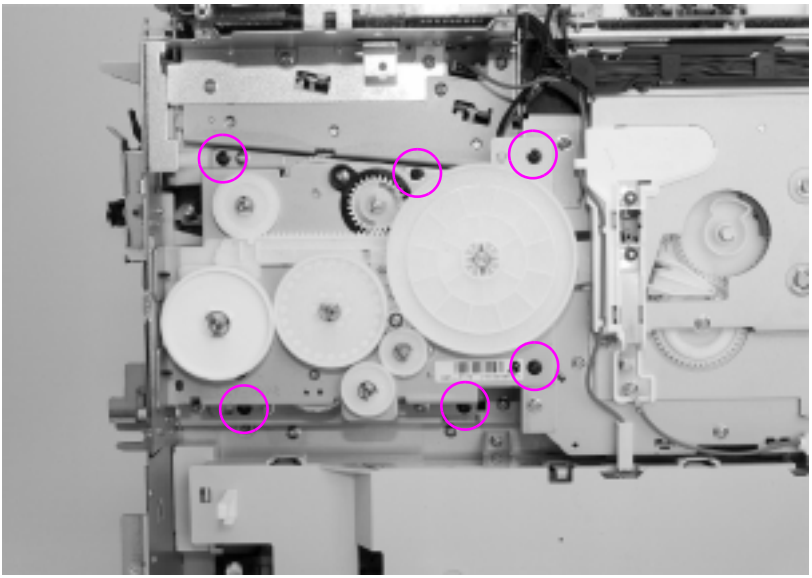


Figure 6-32 **Drum drive assembly removal and replacement (2 of 3)**

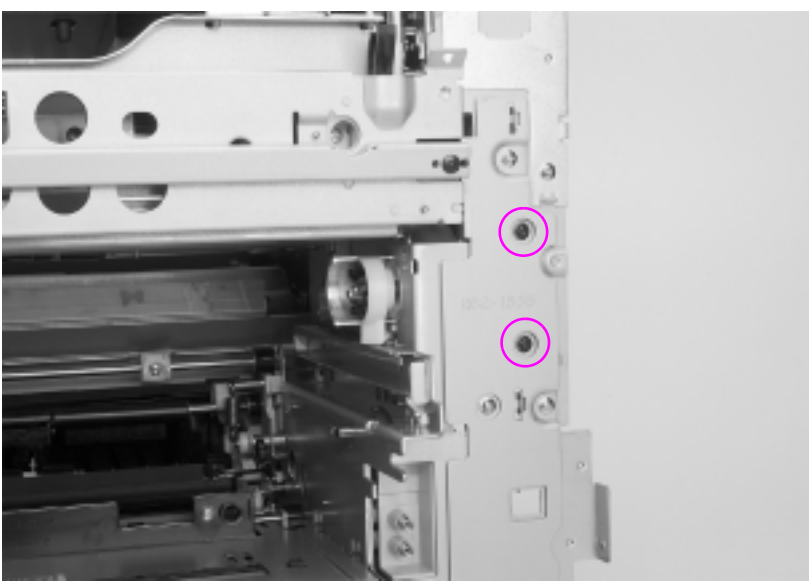


Figure 6-33 **Drum drive assembly removal and replacement (3 of 3)**

Large fan

To remove the large fan

1 Remove formatter pan assembly.

2 Remove the four screws, from the large fan cover and remove the cover shown in Figures 6-34 and 6-35 (callout 1).

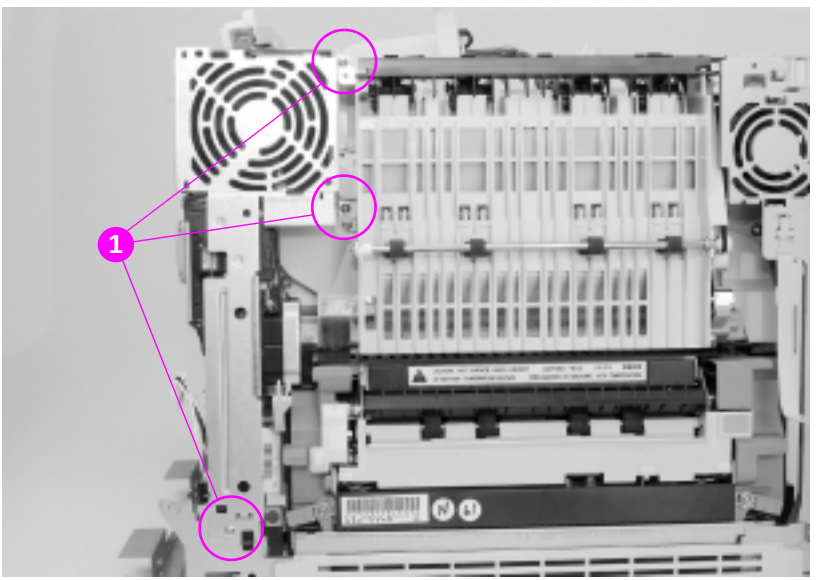


Figure 6-34 **Large fan removal and replacement (1 of 2)**

3 Disconnect J209 on the developing PCB and free the cable from its cable stays.

4 Remove the screw from the right rear fan shown in Figure 6-35 (callout 2).

5 Remove the right rear fan.

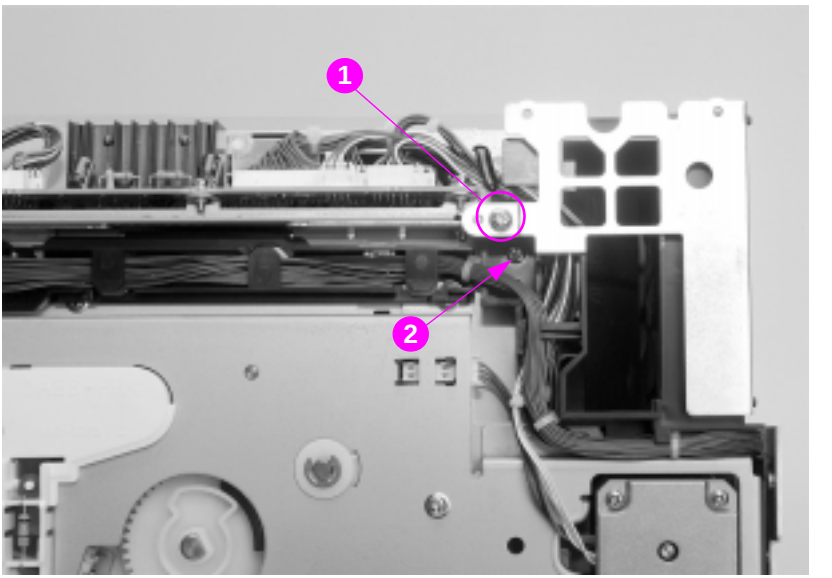


Figure 6-35 **Large fan removal and replacement (2 of 2)**

Carousel drive assembly

To remove the carousel drive assembly

1. Remove the formatter pan assembly.
2. Remove the rear door cover.
3. Remove the large fan.
4. Disconnect the connectors and remove from the rear cable trough.
5. Disconnect the two motor cables from their connectors J203 and J205 located on the developing board.
6. Disconnect the sensor as shown in Figure 6-36 (callout 1).
7. Disconnect the two cables from the HVPS and free the front cable from its cables stays.
8. Push up and out on the cable trough (callout 2) to release the lower tabs. Then push down to release the upper tabs.

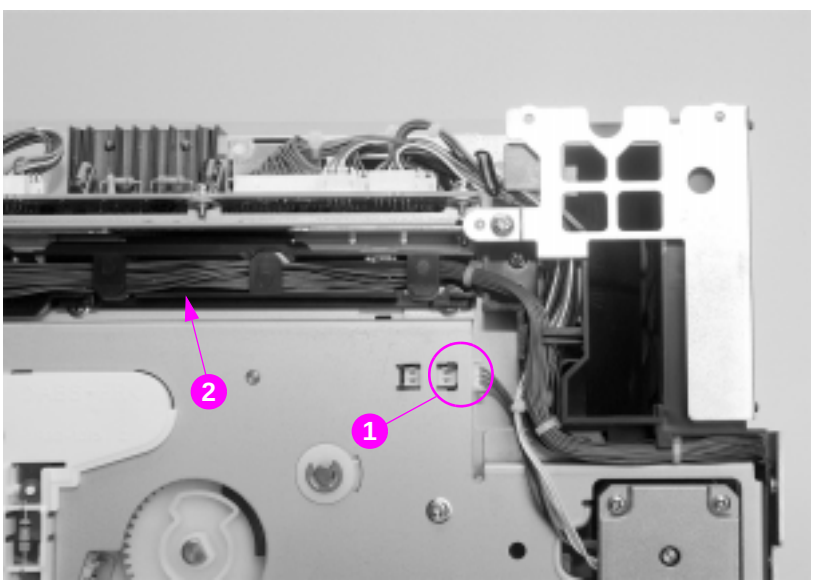


Figure 6-36 **Carousel drive assembly removal and replacement (1 of 2)**

9. Carefully work the cable trough loose from the printer.

10 Remove the four screws shown in Figure 6-37 from the carousel drive assembly.

11 Carefully remove the carousel assembly by pulling the assembly straight out.

Carousel drive assembly replacement tip

- When replacing the carousel drive assembly, be sure to align the “D” shaped shaft with the “D” shaped hub located on the gear in the center of Figure 6-37.

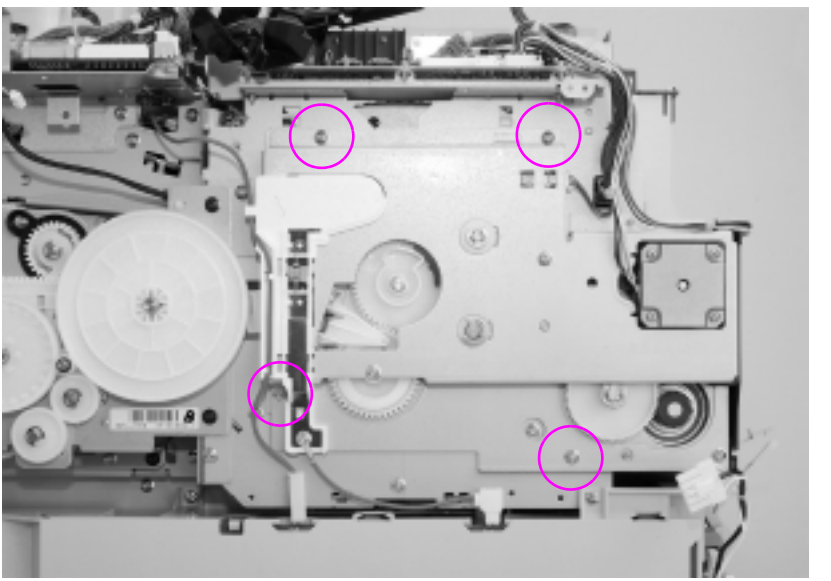


Figure 6-37 **Carousel drive assembly removal and replacement (2 of 2)**

Paper size switch PCB

To remove the paper size switch PCB

1. Remove the HVPS.
2. Disconnect the connector as shown in Figure 6-38 (callout 1).
3. Remove the black screw from the paper size switch PCB (callout 2). Remove the switch PCB.

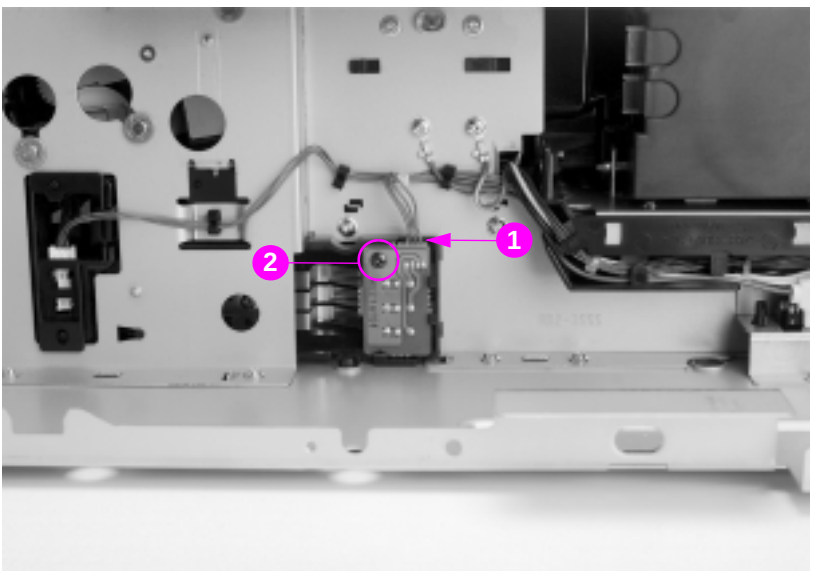


Figure 6-38 **Paper size switch removal and replacement**

Switch plate assembly

To remove the switch plate assembly

1 Remove the top cover.

2 Remove the left side cover.

3 Disconnect the switch shown in Figure 6-39 (callout 1).

4 Remove the two screws from the switch plate assembly (callout 2).

5 Pull the switch plate assembly away from the chassis.

Switch plate assembly replacement tip

- Open both front drawers for easier installation.

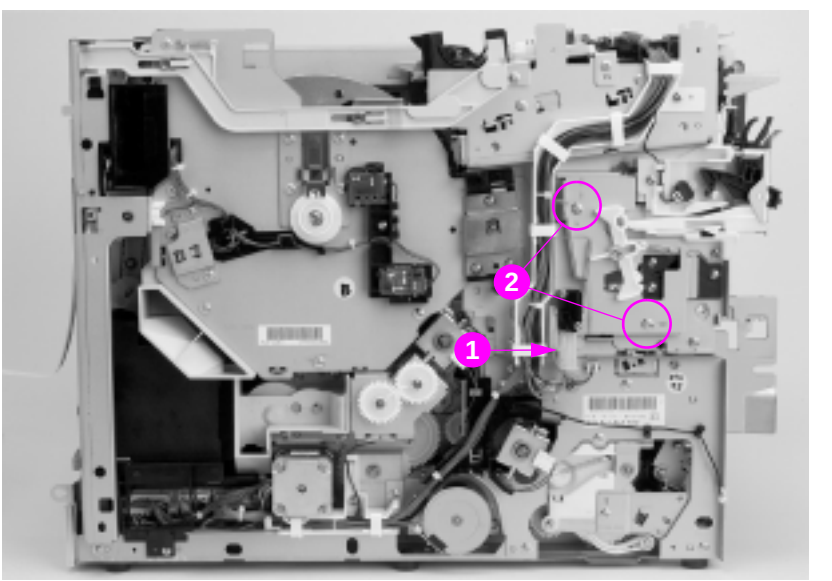


Figure 6-39 **Switch plate assembly removal and replacement**

Paper feed PCB

To remove the paper feed PCB

1. Remove the top cover.
2. Remove the left side cover.
3. Remove the rear door.
4. Remove the fusing assembly.
5. Disconnect the fan connector as shown in Figure 6-40 (callout 1).

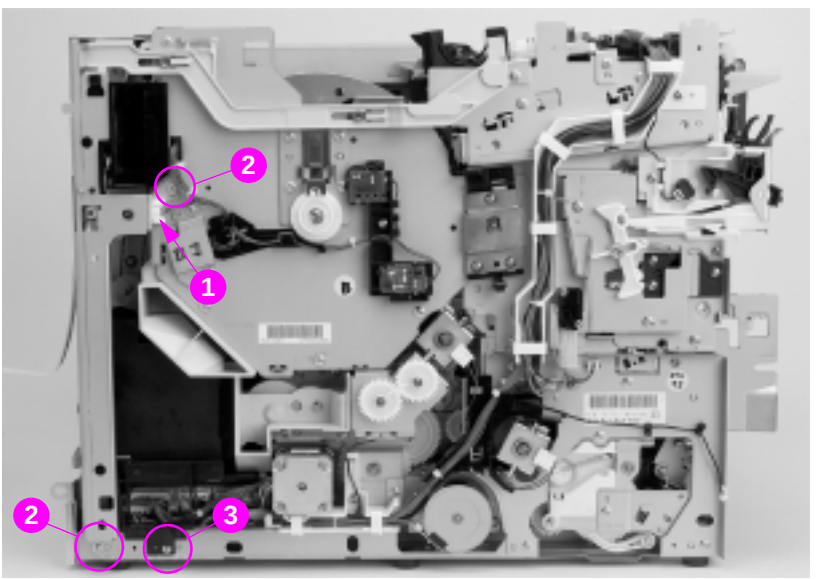


Figure 6-40 **Paper feed PCB removal and replacement (1 of 3)**

6 Remove the three screws from the left rear sheet metal fan cover as shown in Figure 6-40 and Figure 6-41 (callout 2).

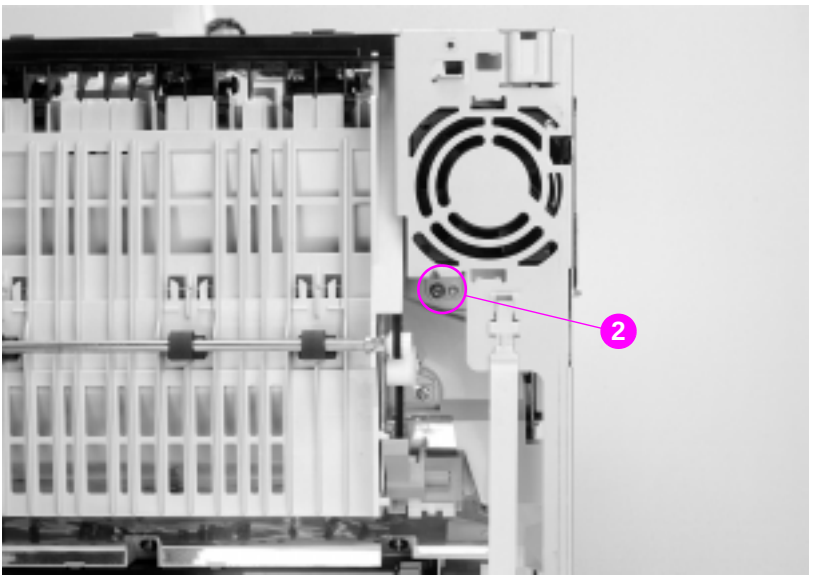


Figure 6-41 **Paper feed PCB removal and replacement (2 of 3**

7 Remove the left rear side sheet metal.

8 Remove the screw in the black plastic cover (Figure 6-40, callout 3).

9 Remove the black plastic cover.

10 Remove the eight cables from their connectors on the paper feed PCB shown in Figure 6-42.

11 Remove the screw from the rear of the paper feed PCB (callout 4).

12 Carefully remove the paper feed PCB by sliding the board backwards, then tilt the top of the board forward to clear the top of the board from the metal tab along the top of the PCB.

Paper feed PCB replacement tip

- Carefully insert the paper feed PCB into the chassis ensuring that the two paper feed PCB metal tabs sit in the open tab holders in the chassis.

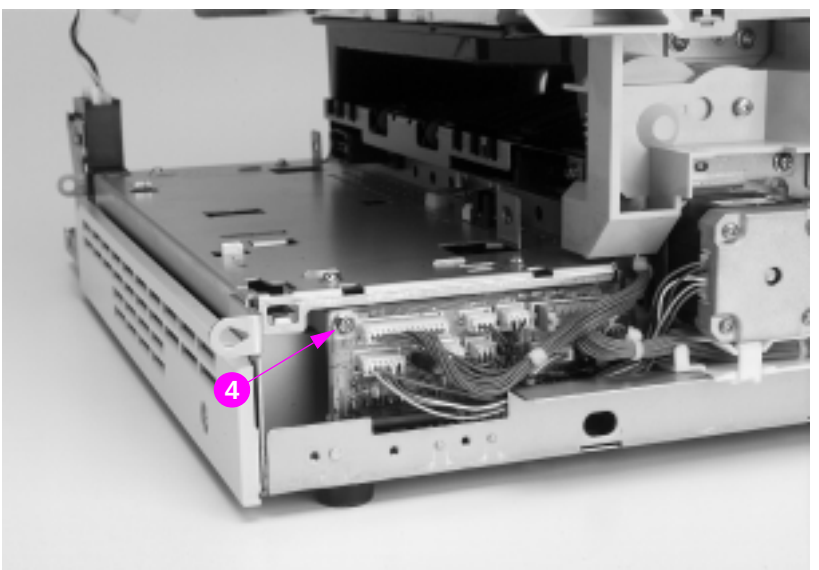


Figure 6-42 **Paper feed PCB removal and replacement (3 of 3)**

Fuser motor

To remove the fuser motor

1 Remove the top cover.

2 Remove the left side cover.

3 Remove the fusing assembly.

4 Remove the screw shown in Figure 6-43 (callout 1) and remove the black plastic piece.

5 Disconnect all eight of the paper feed PCB connectors and remove them from the white cable trough.

6 Remove the screw that secures the white cable trough to the chassis (callout 2).

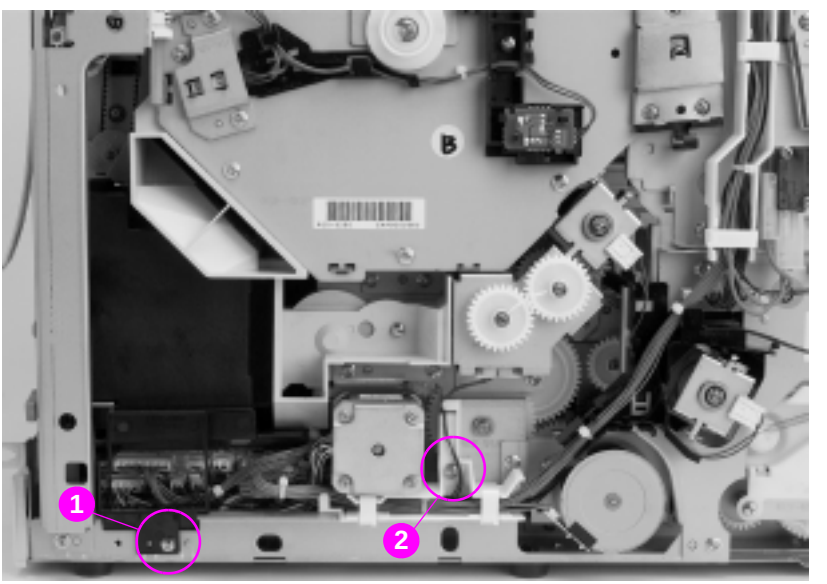


Figure 6-43 **Fuser motor removal and replacement (1 of 2)**

7 Slide the cable trough out from the chassis.

8 Remove the three fuser motor screws shown in Figure 6-44.

9 Carefully pull out to remove the fuser motor and free the cable from the cable stay.

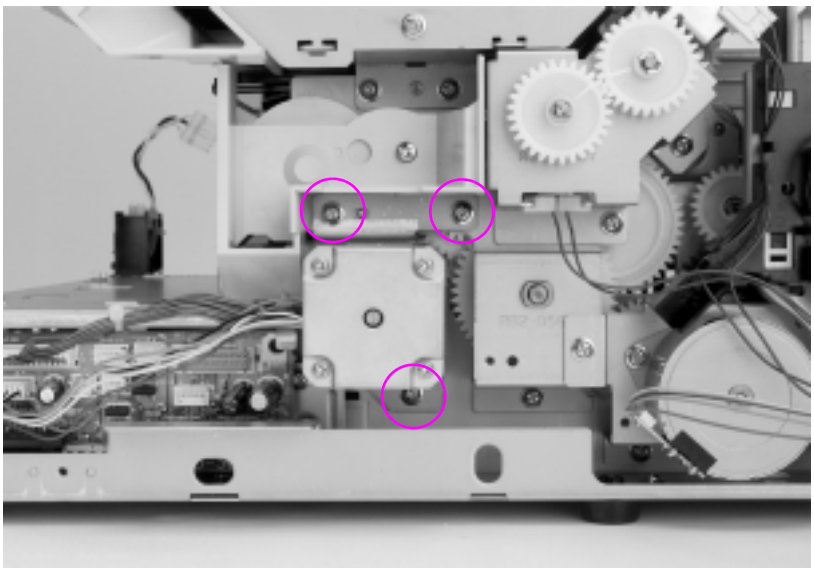


Figure 6-44 **Fuser motor removal and replacement (2 of 2)**

Paper path motor

1. Remove the top cover.
2. Remove the left side cover.
3. Disconnect the paper path motor connector (J109) from the paper feed PCB and remove it from the cable trough.
4. Remove the two screws on both sides of the paper path motor shown in Figure 6-45.
5. Remove the paper path motor by sliding the motor backwards and then out to clear the gear on the motor.

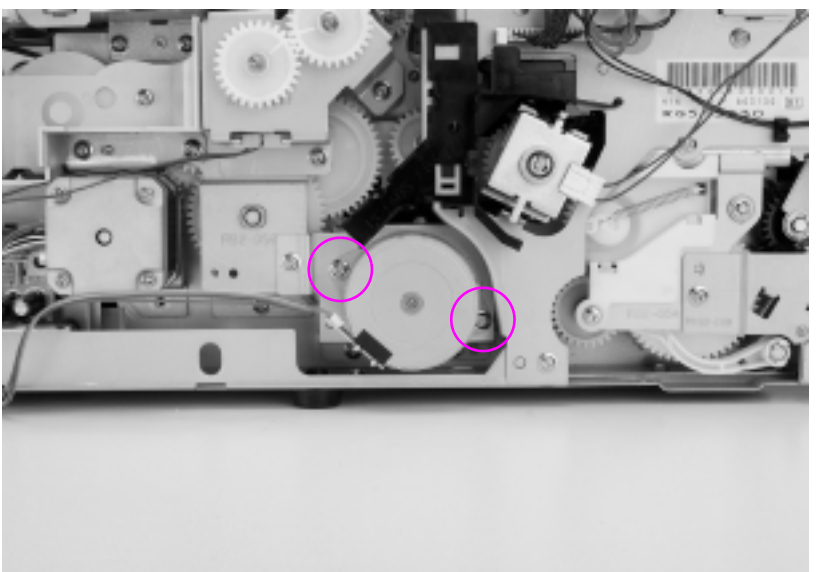


Figure 6-45 **Paper path motor removal and replacement**

Paper pick solenoid

To remove the paper pick solenoid

1. Remove the top cover.
2. Remove the left side cover.
3. Disconnect the solenoid connector (J106) from the paper feed PCB, and free the cable from the cable stays.
4. Remove the one screw shown in Figure 6-46 that holds the solenoid assembly in place and then remove the solenoid assembly.

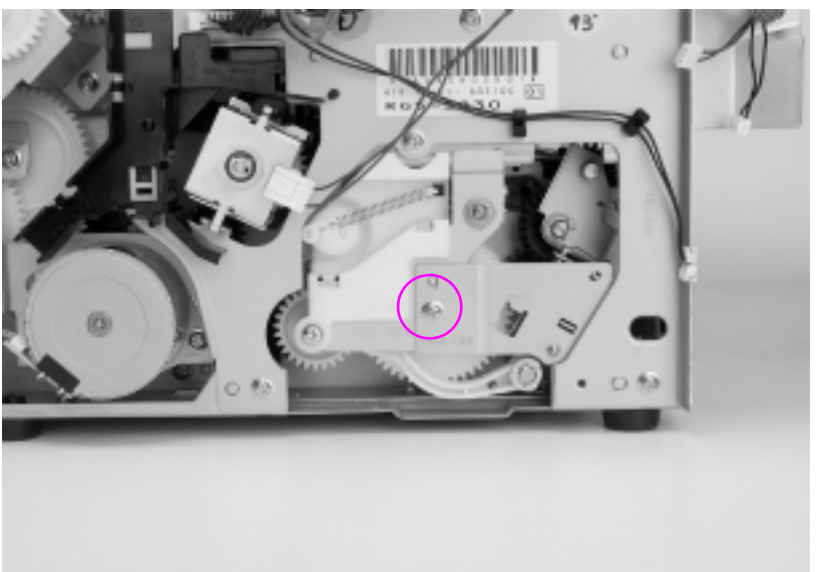


Figure 6-46 **Paper pick solenoid removal and replacement**

ITB cleaning roller clutch (CL3)

To remove the ITB cleaning roller clutch

1. Remove the top cover.
2. Remove the left side cover.
3. Unplug the connector (J104) paper feed PCB.
4. Using needle-nose pliers, remove the E-ring and the gear (callout 1).
5. Using needle-nose pliers, remove the E-ring and ITB cleaning roller clutch (callout 2).

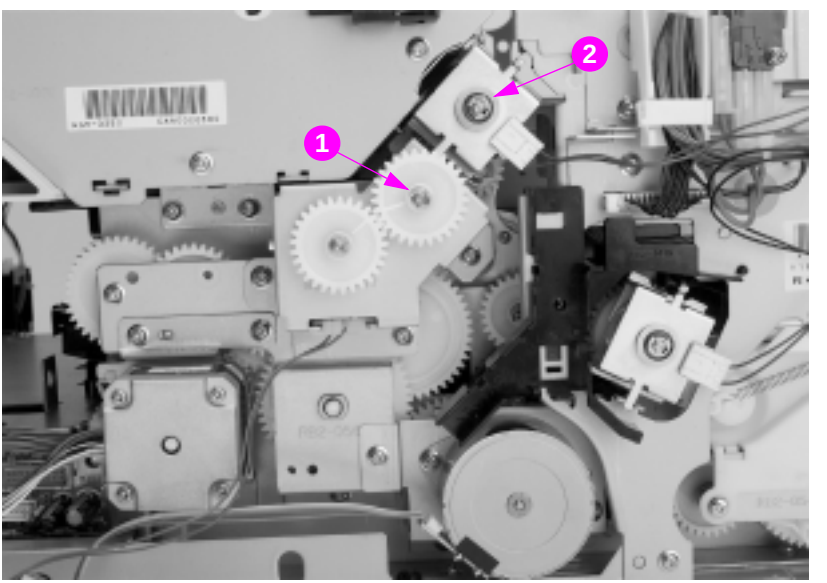


Figure 6-47 **ITB cleaning roller clutch removal and replacement**

ITB clutch (CL2) assembly

To remove the ITB clutch assembly

1. Remove the top cover.
2. Remove the left side cover.
3. Remove the ITB cleaning roller clutch.
4. Remove the screw shown in Figure 6-32 and remove the plastic shroud.

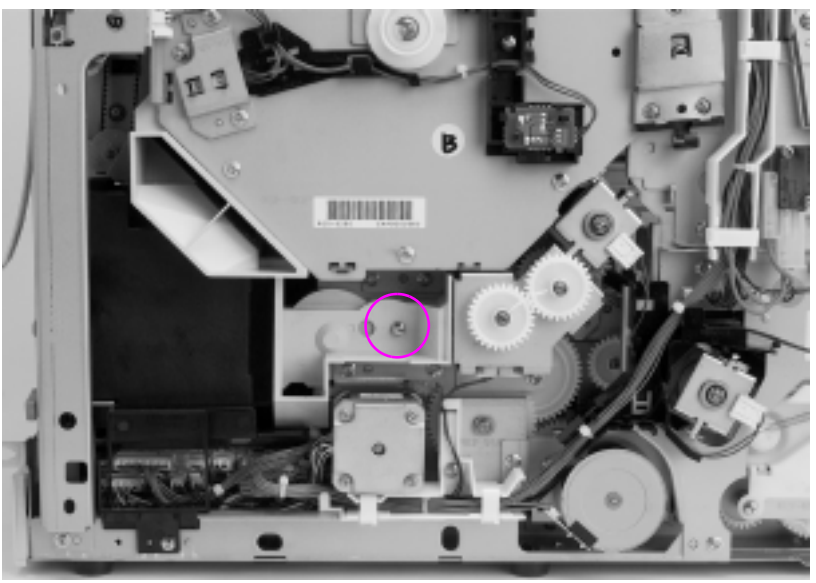


Figure 6-48 **ITB clutch assembly removal and replacement (1 of 2)**

5 Disconnect the ITB connector (J103) from the paper feed PCB.

6 Remove the three screws shown in Figure 6-49 and remove the clutch assembly.

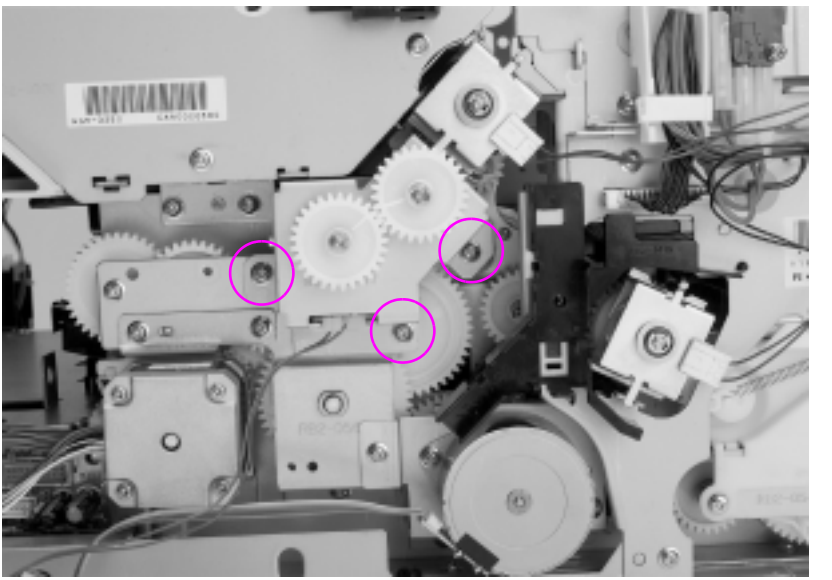


Figure 6-49 **ITB clutch assembly removal and replacement (2 of 2)**

Transfer roller cam clutch (CL4)

To remove the transfer cam clutch

1. Remove the top cover.
2. Remove the left side cover.
3. Disconnect the connector (J105) from the paper feed PCB and remove the cable from the cable stays.
4. Remove the E-ring shown in Figure 6-50 with longnosed pliers and remove the clutch.

transfer cam clutch replacement tip

- When reinstalling the clutch assembly gears, make sure the timing marks on the gears are pointing at each other.

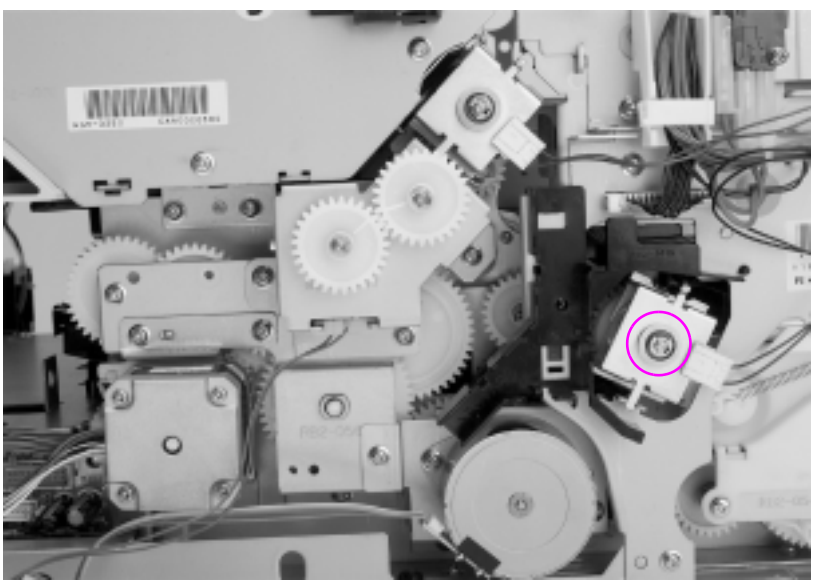


Figure 6-50 **Transfer roller cam clutch removal and replacement**

Left side gears

To remove the transfer cam clutch

1. Remove the top cover.
2. Remove the left side cover.
3. Remove the fusing assembly.
4. Remove the screw as shown in Figure 6-43 and remove the shroud.
5. Disconnect all connectors from the paper feed PCB.
6. Free the cables from the cable stays.
7. Using a small flat blade screwdriver, push in the tab and remove the small black cable guide.
8. Remove the fuser motor.
9. Remove the paper path motor.
10. Remove the three clutches.
11. Remove the four screws shown in Figure 6-51 and remove the sheet metal over the gears.
12. Remove the paper pick solenoid.
13. Using longnosed pliers, remove the screw and E-ring and remove the plate shown in Figure 6-52.
14. Remove any E-rings or bushings necessary to remove the gears.

Left side gear replacement tip

- Reinstall the gears in the following order.

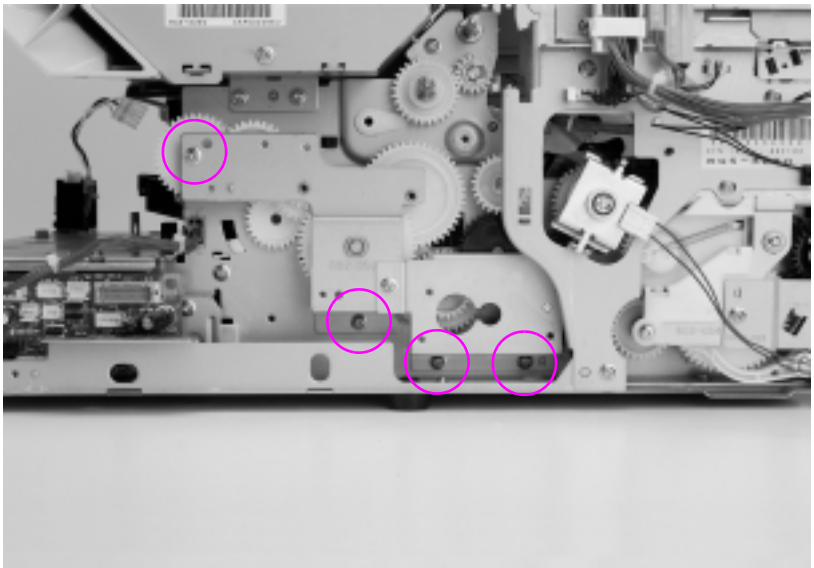


Figure 6-51 **Left side gears removal and replacement (1 of 2)**

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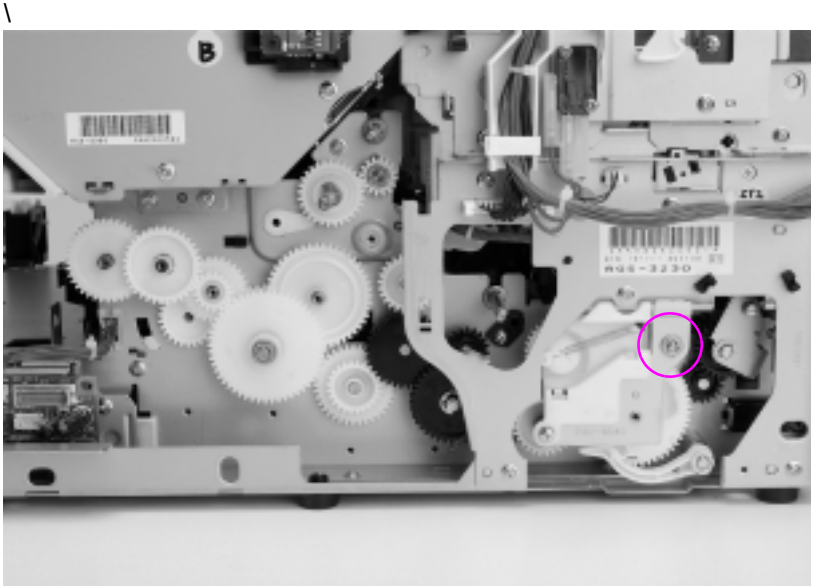

Figure 6-52 **Left side gears removal and replacement (2 of 2)**

Right side fan

To remove the right side fan

1 Remove the formatter pan assembly.

2 Remove the four screws as shown in Figures 6-53 and 6-54, and remove the fan shield.

3 Disconnect the fan cable (J209) from the developing PCB.

4 Remove the fan cable from the cable stays.

5 Remove the fan by releasing the plastic tabs and sliding the fan out.

Right side fan replacement tip

- Ensure that the fan cable is facing out and located in the lower corner.

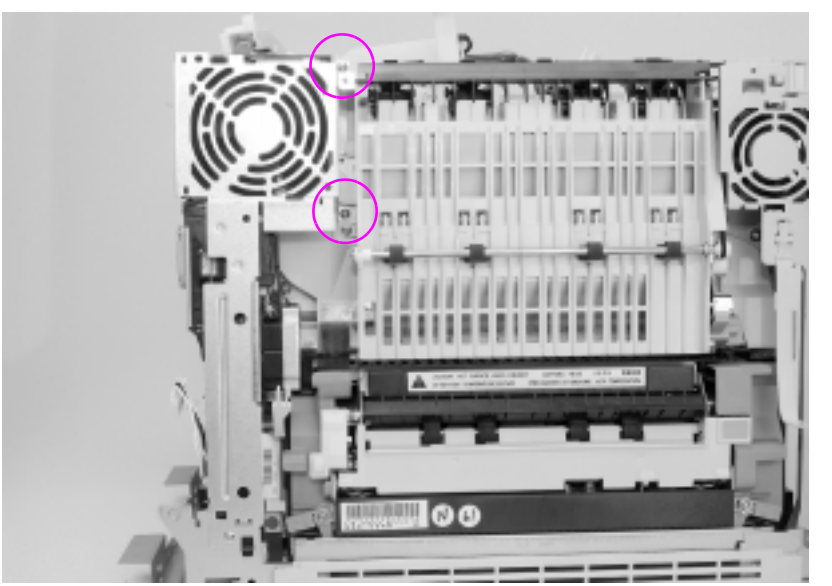

Figure 6-53 **Right side fan removal and replacement (1 of 2)**

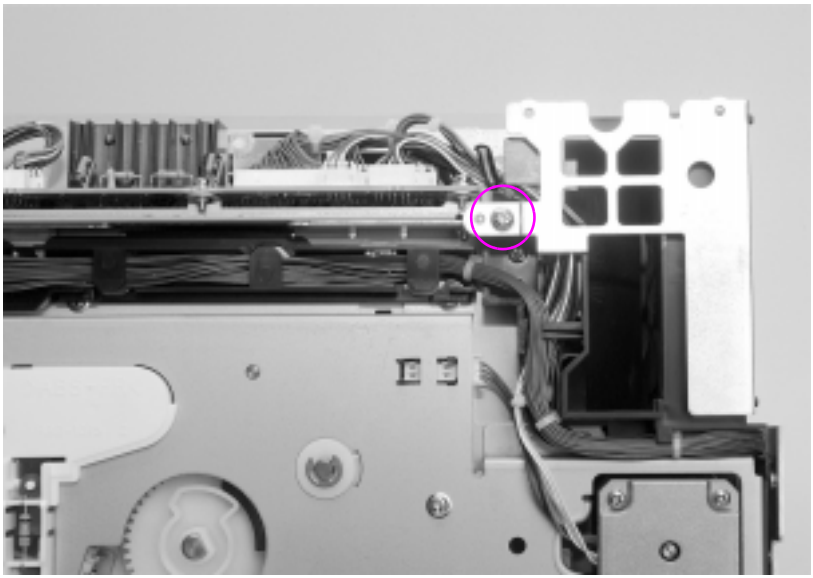

Figure 6-54 **Right side fan removal and replacement (2 of 2)**

Left side fan

To remove the left side fan

1 Remove the top cover.

2 Remove the left side cover.

3 Remove the rear door.

4 Disconnect the cable shown in Figure 6-55 (callout 1).

5 Remove the three screws from the left rear sheet metal fan cover shown in Figures 6-55 and 6-56 (callout 2) and remove the sheet metal housing the fan.

6 Disconnect the cable shown in Figure 6-57 (callout 1).

7 Remove the screw from the black plastic cover and remove the fan casing shown in Figure 6-57 (callout 2).

8 Free the fan cable from the cable stay.

9 Press out on the three plastic tabs and slide the fan out.

Left side fan replacement tip

- Align the arrow on top of the fan with the arrow on the fan housing.

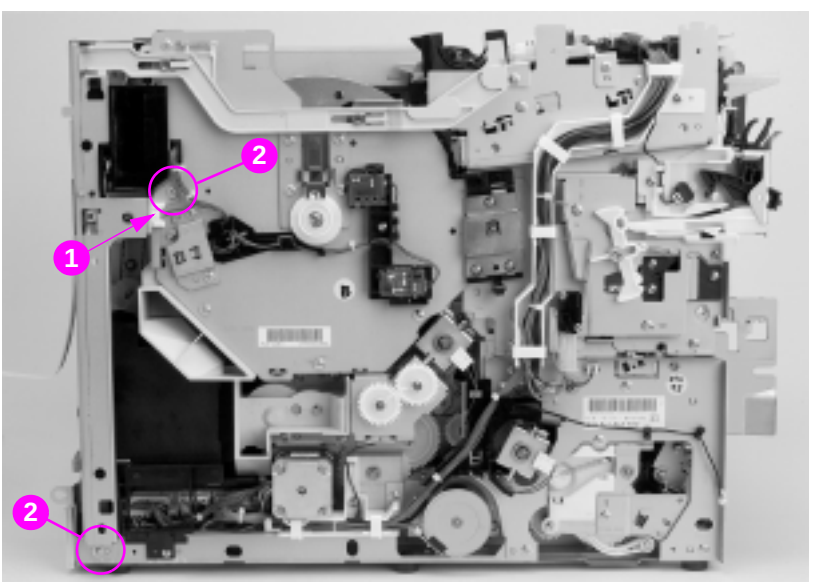

Figure 6-55 **Left side fan removal and replacement (1 of 3)**

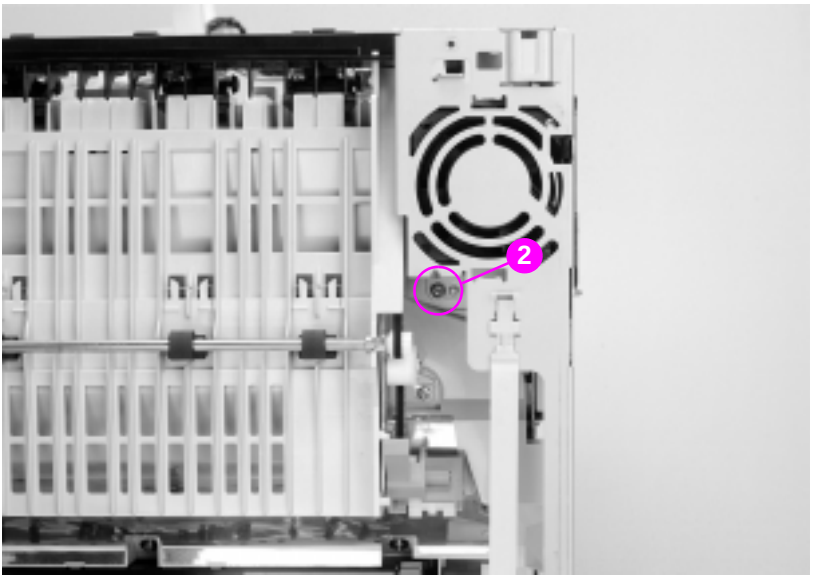

Figure 6-56 **Left side fan removal and replacement (2 of 3)**

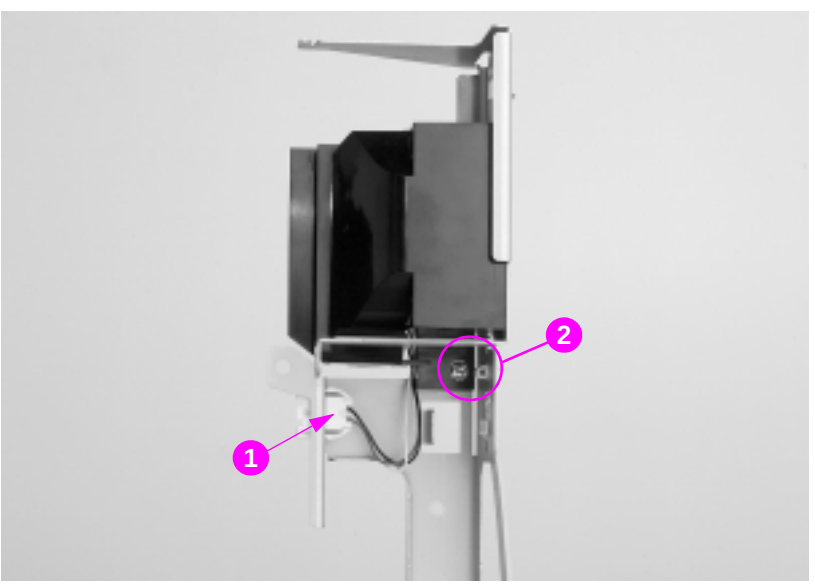

Figure 6-57 **Left side fan removal and replacement (3 of 3)**

Rear paper path assembly

To remove the rear paper path assembly

1. Remove the top cover.
2. Remove the left side cover.
3. Remove the rear door.
4. Remove the left side fan assembly.
5. Disconnect the bin full sensor shown in Figure 6-58 (callout 1).
6. Remove the three screws from the rear paper path assembly (callout 2).
7. Remove the assembly by pulling the bottom of the assembly out and ensure the tab is released. Lift assembly up and away from the printer.

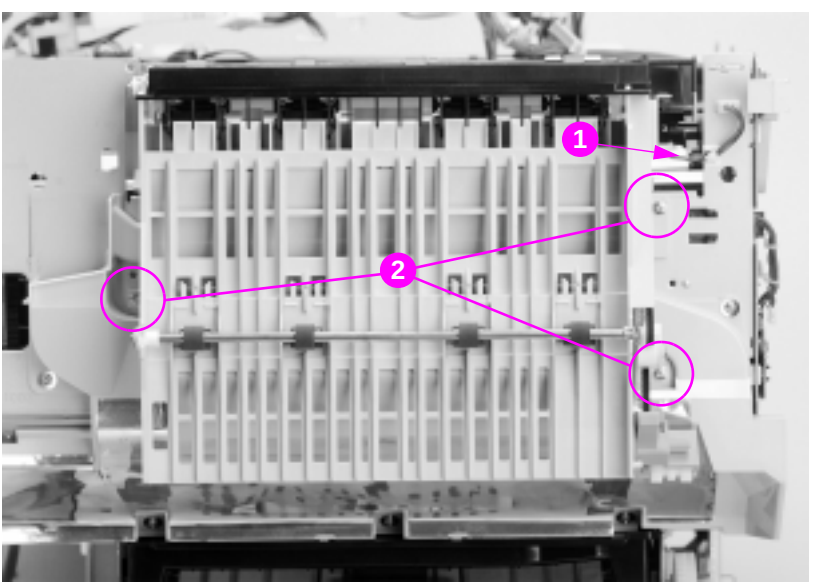

Figure 6-58 **Rear paper path assembly removal and replacement**

Carousel housing assembly

To remove the carousel housing assembly

1. Remove the toner cartridges from the carousel.
2. Remove the RFI shield.
3. Remove the formatter pan assembly.
4. Remove the rear door.
5. Remove the fusing assembly.
6. Remove the toner catch tray by pushing down on the middle of the tray as shown in Figure 6-63 (callout 1) and pulling out.
7. Remove the carousel drive assembly.
8. Remove the developing PCB.
9. Remove the screw from the carousel brake assembly shown in Figure 6-59 and remove the brake assembly.

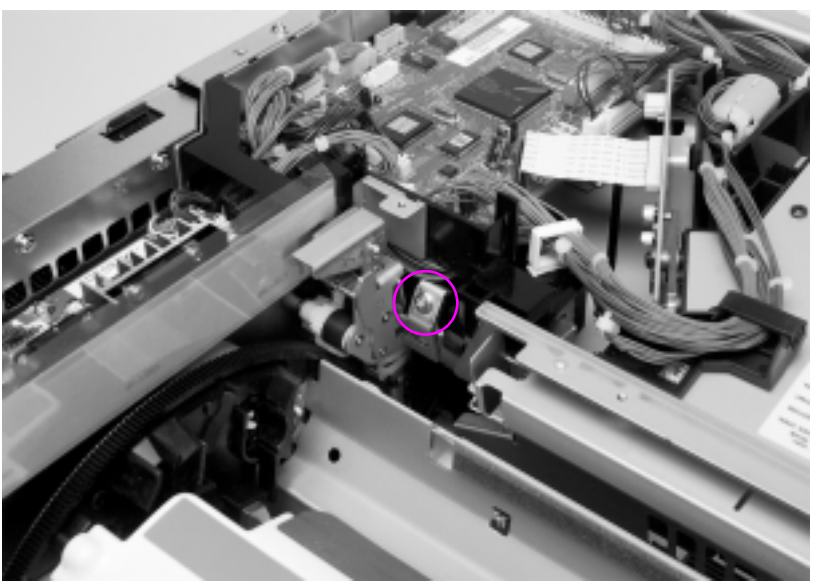

Figure 6-59 **Carousel housing assembly removal and replacement (1 of 4)**

10. Remove the power supply.
11. Remove the HVPS.

12 Remove the left side fan assembly.

13 Open the front drawer half way.

14 Remove the three screws shown in Figure 6-60. Release the two black tabs and pull out the drum plate.

15 Remove the 2 screws shown in Figure 6-61.

16 Remove the 4 screws shown in Figure 6-62.

WARNING! Once the carousel assembly is removed, the printer will tip forward if both the upper front drawer and the middle front drawer are fully open.

17 Working from the back of the printer, slide the carousel housing assembly towards the left side of the printer, then lift up and out.

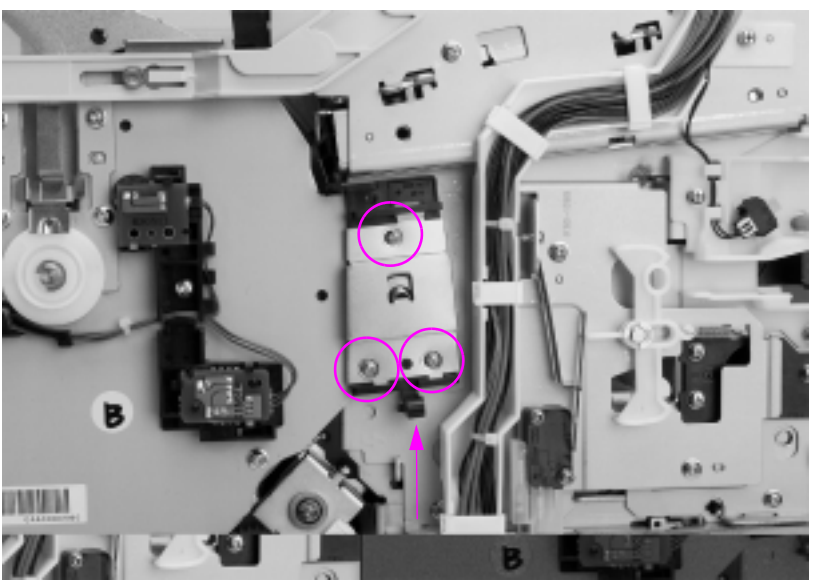

Figure 6-60 **Carousel housing assembly removal and replacement (2 of 4)**

Carousel housing assembly replacement tip

- Insert the drum mounting bracket with the screws loose, and then tighten the screws.

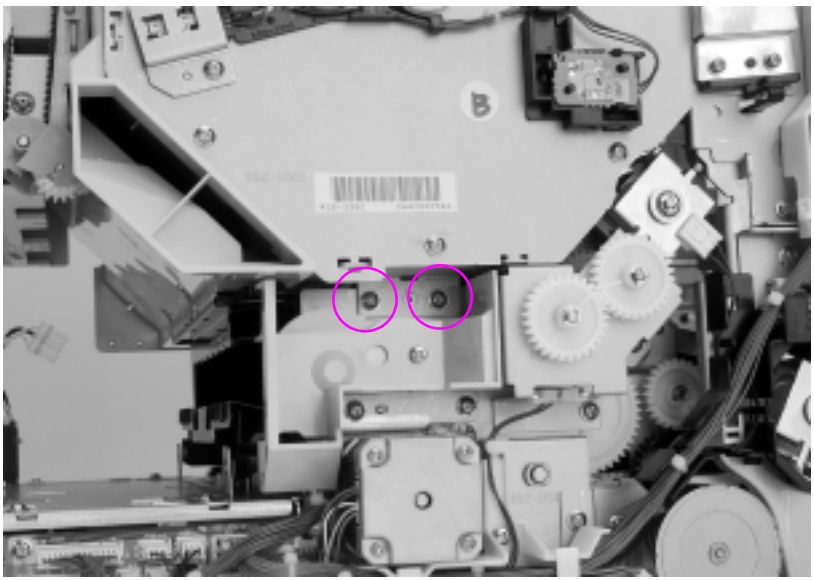

Figure 6-61 **Carousel housing assembly removal and replacement (3 of 4)**

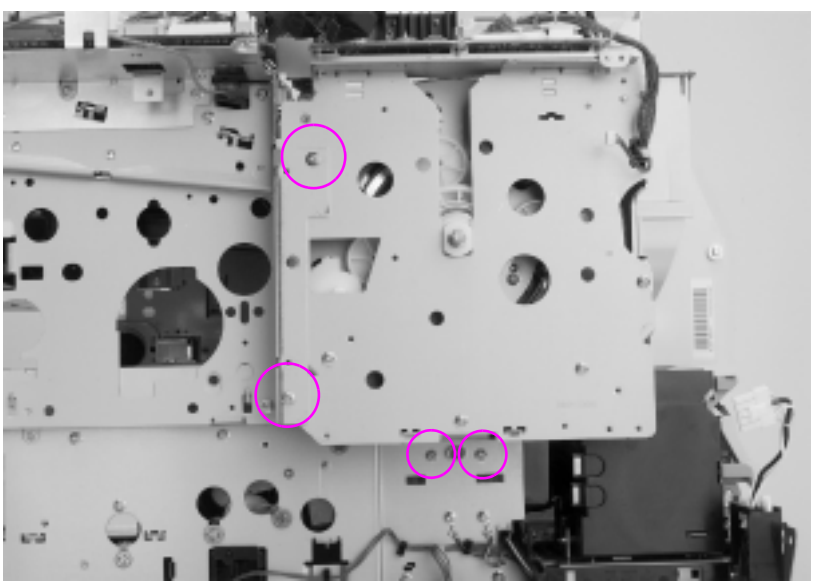

Figure 6-62 **Carousel housing assembly removal and replacement (4 of 4)**

Paper transport assembly

To remove the paper transport assembly

1. Remove the fusing assembly.
2. Remove the toner catch tray by pushing down in the middle and sliding it straight out as shown in Figure 6-63 (callout 1).
3. Remove the screw from the rear left assembly (callout 2).
4. Slide the paper transport assembly towards the right side of the printer until it stops. Tilt the front of the assembly up to clear the shaft in the front and carefully work the assembly out of the printer.

Paper transport assembly replacement tip

- Make sure all tabs are under the metal slots.

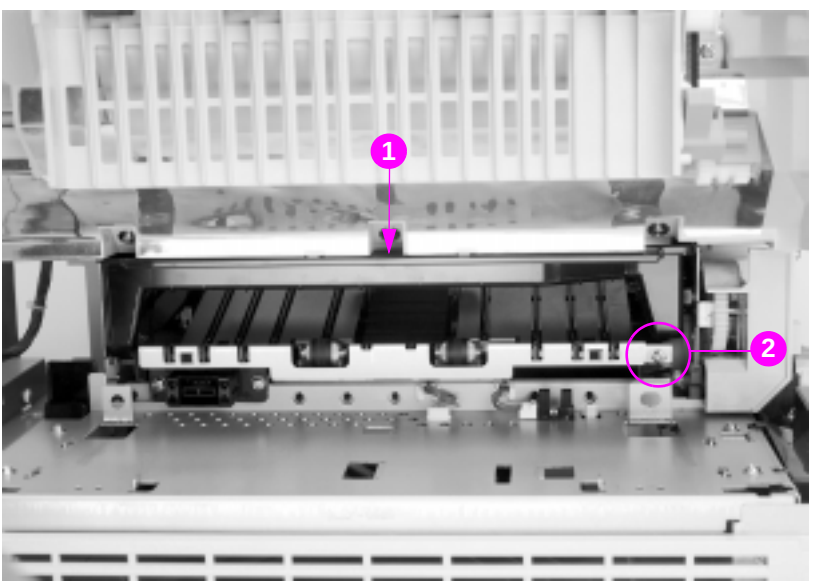

Figure 6-63 **Paper transport assembly removal and replacement**

Paper pick rollers

To remove the paper pick rollers

1 Remove the paper tray.

2 Pull the paper pick roller shaft down until it releases from the two plastic clips shown in Figure 6-64.

Paper pick roller replacement tip

- Note the three splines on the end of the shaft. Ensure they are correctly aligned with the slots on the drive socket.

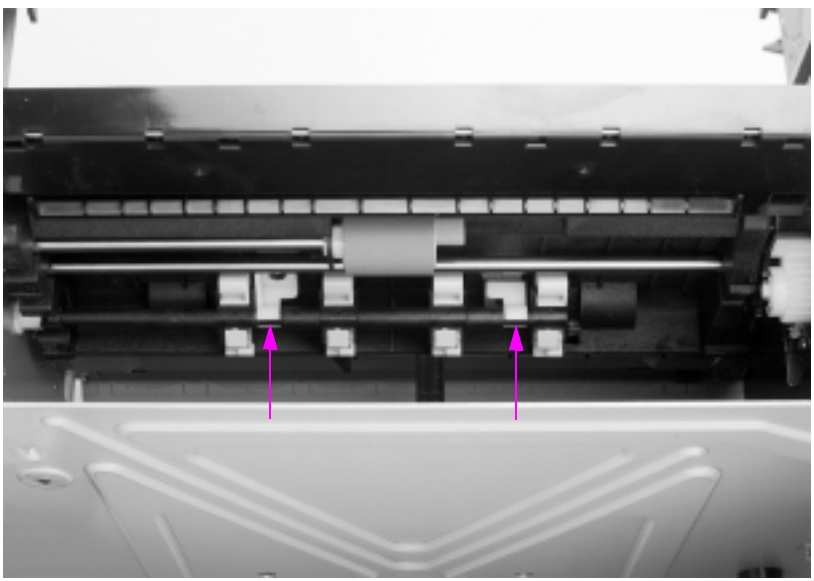

Figure 6-64 **Paper pick rollers removal and replacement**

Star wheel assembly

To remove the star wheel assembly

1. Remove the middle front drawer.
2. Open the upper front drawer and remove the drum cartridge.
3. Disconnect the spring as shown in Figure 6-65 (callout 1).
4. Remove the linkage screw on the left (callout 2).
5. Carefully pull the assembly forward to remove it from the shaft.

Star wheel assembly replacement tip

- Insert the linkage over the shaft first.

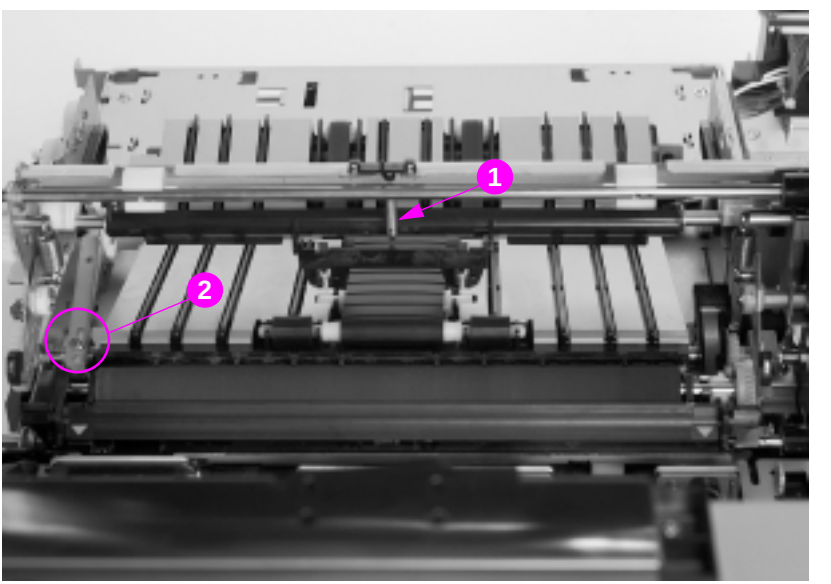

Figure 6-65 **Star wheel assembly removal and replacement**

Transfer roller assembly

To remove the transfer roller assembly

1. Remove the HVPS.
2. Remove the left side cover.
3. Remove the middle front drawer.
4. Open the upper front drawer and remove the drum cartridge.
5. Remove the star wheel assembly.
6. Using needle-nose pliers, remove the E-ring on each side of the shaft.
7. Remove the gear.
8. Remove the bushings.
9. Slide the assembly out of the chassis.

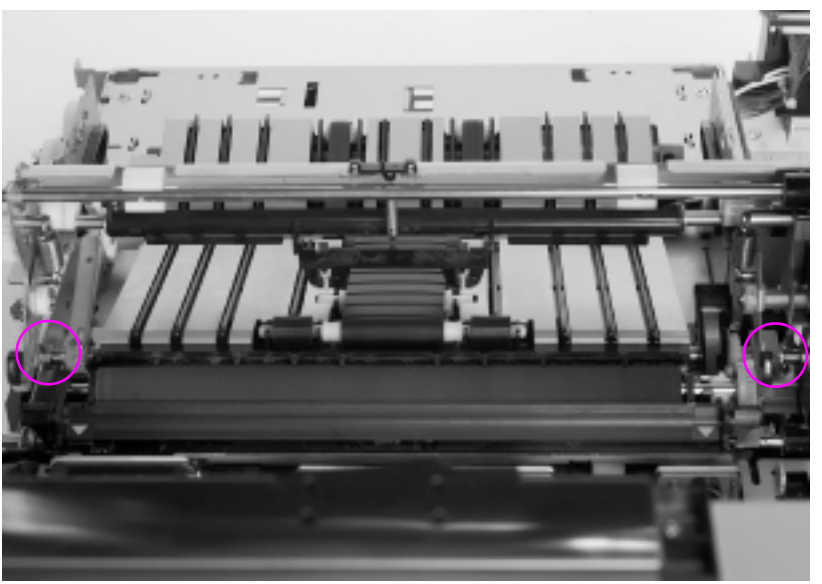

Figure 6-66 **Transfer roller removal and replacement**

Cam shafts

To remove the cam shafts

1. Remove the HVPS.
2. Remove the left side cover.
3. Remove the middle front drawer.
4. Open the upper front drawer and remove the drum cartridge.
5. Remove the appropriate clutch or gear on the left side.
6. Using needle-nose pliers, remove the E-rings from each end of the shaft being removed.
7. Remove the bushings.
8. Remove the shaft.

Note If the shaft is fine and only the cams need replacing, remove the screw from the cam and replace only the cam.

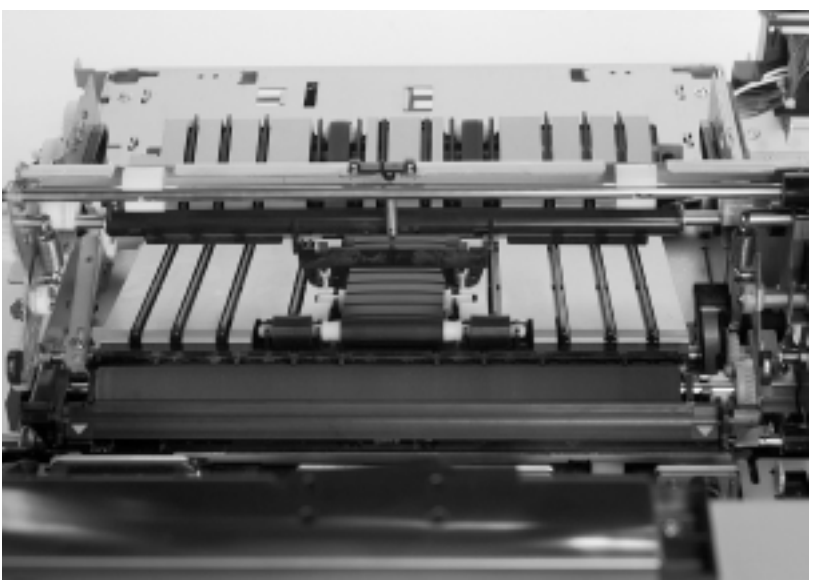

Figure 6-67 **Cam shaft removal and replacement)**

7 Troubleshooting

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Introduction

This troubleshooting chapter assumes the reader has a basic understanding of the color laser printing process. For explanations of each of the mechanical assemblies of the printer described in the troubleshooting procedures and their relation to the color laser printing process, refer to Chapter 5. Do not perform any of these troubleshooting processes without fully understanding the function of each mechanism.

This chapter contains the following sections:

- **Troubleshooting process** includes a pre-troubleshooting checklist and a troubleshooting flowchart. These items contain information on common items that may inhibit proper printer operation.
- **Printer error troubleshooting** explains each control panel display message and suggests recommendations for clearing the cause of each message. When the printer message indicates a failure whose root cause is not obvious, use this section, together with the “aids to troubleshooting” later in this chapter, to solve the problem.
- **Paper path troubleshooting** provides techniques to solve paper feed problems. This section explains print media checks, troubleshooting jams, and the differences between jams caused by media and those caused by the printer.
- **Image formation troubleshooting** provides print samples to help identify print defects, and suggests methods for solving the problem.
- **Interface troubleshooting** helps isolate communications problems to the printer hardware, printer or network configuration, or to the software application.
- **Troubleshooting tools** provides tools to help isolate the cause of many printer failures. This section includes explanations of the printer configuration page, the event log, Service mode, and important printer diagrams.

Troubleshooting process

The troubleshooting process requires both mental and hands-on investigation of printer errors and problems.

- Use the pre-troubleshooting checklist to evaluate the source of the problem and to reduce the number of steps required to fix the problem.
- Use the troubleshooting flowchart to pinpoint the root cause of hardware malfunctions. This flowchart guides you to the appropriate section of this chapter that provides steps for correcting the malfunction.

Before troubleshooting any specific printer problem, ensure that:

- Any overdue maintenance is performed.
- The maintenance units are within their rated life. Check the configuration page.

Note The customer is responsible for ensuring that consumable items are in good condition.

Pre-troubleshooting checklist

Environment

- The printer is installed on a solid, level surface.
- Power supply voltage is within ± 10 volts of the specified power source.
- The power supply plug is inserted in the printer and the outlet. (Also verify that the power supply plug of the paper deck at the duplexer unit is properly connected.)
- The operating environment is within the specified parameters, as listed in chapter 1 of this manual.
- The printer is not exposed to ammonia gas such as that produced by diazo copiers or office cleaning materials.
- The printer is never exposed to direct sunlight.

Paper checks

- The customer is using supported media.
- Check the condition of the media (curl, folded, etc.).
- The media is stored correctly and within environmental limits.

Paper

- Specified volume (or less) is loaded into the paper source.
- The paper is set to the correct paper source.

Toner cartridge

- The color toner cartridges for each color are set correctly.

Drum cartridge

- The drum cartridge is seated in the printer properly.

ITB and fusing

- The ITB and fusing units are seated properly.

Doors and drawers

- The toner cartridge door, delivery unit drawer, drum cartridge drawer, and ITB unit drawer are closed correctly.

Condensation

- If condensation occurs following a temperature change (particularly in winter following cold storage), wipe affected parts dry or leave the printer on for 10-20 minutes.

Miscellaneous

- Any non-HP components (toner, memory modules, and EIO cards) are removed from the printer.
- Printer hardware or software configuration has not changed, or the problem is not associated with any specific software. Contact the Customer care center for software-related problems (see Chapter 1).
- Remove the printer from the network and ensure that the failure is associated with the printer before beginning troubleshooting.

WARNING! Electrical current is present in various printer parts whenever the printer is plugged in, even if the power switch is in the standby position. Line voltage is exposed when the right cover and formatter pan are removed.

Troubleshooting flowchart

The troubleshooting flowchart shown in Figure 7-1 highlights the process that most quickly solves printer hardware problems. During its power on sequence, the printer verifies that its components are operating correctly. If the printer fails to power on correctly, use the steps shown to troubleshoot the failure.

Each heading depicts a major troubleshooting step. A “yes” answer to the questions allows you to proceed to the next major step.

A “no” answer indicates that additional testing is needed. Proceed to the referenced location and follow the directions for that area. After completing the additional testing, proceed to the next major step.

Troubleshooting flowchart

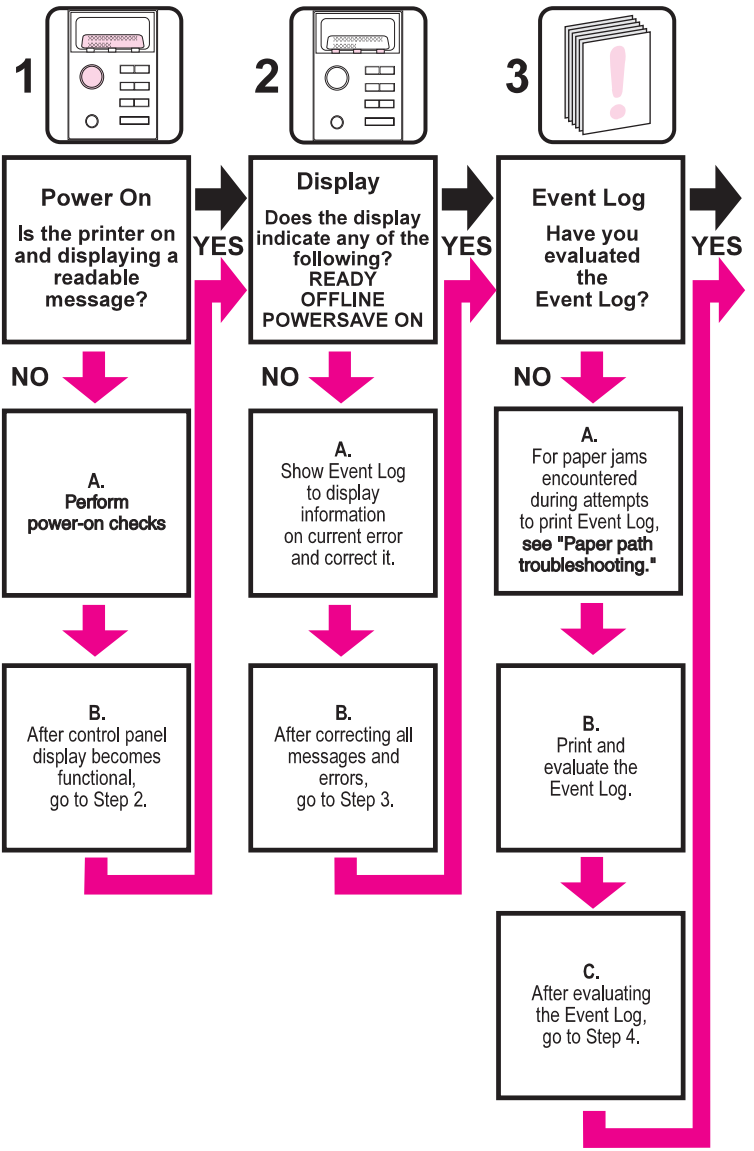


Figure 7-1 **Troubleshooting flowchart (1 of 2)**

Troubleshooting flowchart (continued)

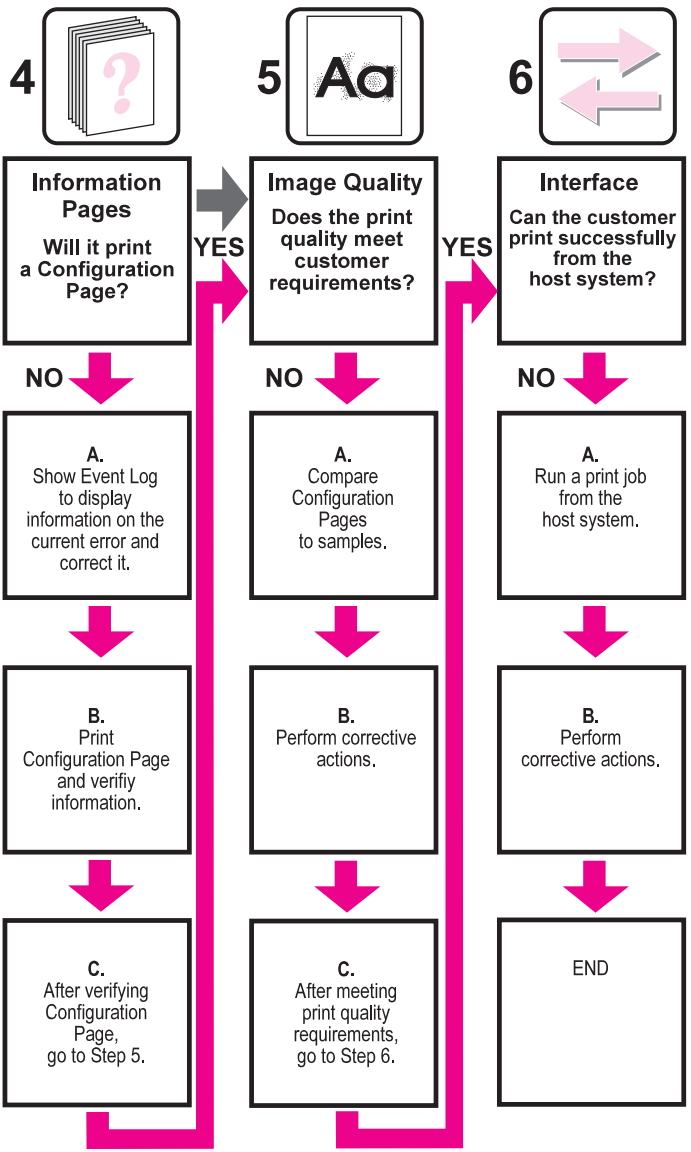

4
5
6
Information Pages
Will it print a Configuration Page?
YES
Image Quality
Does the print quality meet customer requirements?
YES
Interface
Can the customer print successfully from the host system?
NO
NO
NO
A. Show Event Log to display information on the current error and correct it.
B. Print Configuration Page and verifiy information.
C. After verifying Configuration Page, go to Step 5.
A. Compare Configuration Pages to samples.
B. Perform corrective actions.
C. After meeting print quality requirements, go to Step 6.
A. Run a print job from the host system.
B. Perform corrective actions.
END

Figure 7-2 **Troubleshooting flowchart (2 of 2)**

Troubleshooting power-on

Power-on check

1. Verify the printer is plugged into an active electrical outlet.
2. Verify the power-on button is pushed in.
3. Make sure the fans are still running.
4. Ensure sure control panel display is on.
5. Check fuse in power supply (see Figure 7-30).
6. Replace the power supply.

Printer error troubleshooting

Printer messages

The following tables explain messages that might display on the printer control panel. Alphabetical printer messages and their meanings are listed in Table 7-1, and numerical printer messages are listed in Table 7-2.

Hint

If a message persists requesting that you load a tray, or if a message indicates that a previous print job is still in the printer's memory, press [Go] to print or press [Cancel Job] to clear the job from the printer's memory.

Note

Not all messages are described (many are self-explanatory).

Some printer messages are affected by the Auto continue and Clearable warning settings from the Configuration menu in the printer control panel. If CLEARABLE WARNING=JOB is set on the control panel, warning messages display until the end of the job from which they were generated. If CLEARABLE WARNING=ON is set, warning messages display until [Go] is pressed. If an error occurs that prevents printing and AUTO CONTINUE=ON is set, the printer goes offline for 10 seconds before it returns online. If AUTO CONTINUE=OFF is set, the message displays until [Go] is pressed.

Alphabetical printer error messages

Table 7-1 Alphabetical printer error messages

ACCESS DENIED MENUS LOCKED	
Description: Displayed for approximately 5 seconds when a user has attempted to select a menu value while the printer control panel locking is enabled.	**Action:** See the system administrator for access to the printer control panel.
BAD DUPLEXER CONNECTION	
Description: The duplex printing accessory is not correctly installed.	**Action:** **1** Check that the duplex printing accessory power cord is plugged into the printer and the power cord is plugged into the duplex unit. **2** Turn printer off and then on. **3** If the error continues, verify that the duplex printing accessory is correctly installed. **4** If error persists, replace duplexer.
CALIBRATION EXECUTING	
Description: The printer is executing an internal color calibration. This process should take approximately 90 seconds.	**Action:** No action is required.
CANCELING JOB	
Description: The printer is canceling the current print job. Incoming data for the current job will be discarded.	**Action:** No action is required.
CANNOT DUPLEX CLOSE REAR BIN	
Description: The printer cannot duplex because the rear output bin is open.	**Action:** Close rear output bin door.

Table 7-1 Alphabetical printer error messages (continued)

CANNOT DUPLEX CHECK REAR BIN alternates with CANNOT DUPLEX CHECK PAPER

Description:
The printer cannot duplex because the rear output bin is open or the media is not supported by the duplex printing accessory.

Action:

1. Close the rear output bin.
2. Verify that the media is supported by the duplex printing accessory. See Supported media weights and sizes in Chapter 1.

CHECKING PRINTER

Description:
The printer is performing an internal test. This process should take approximately 30 seconds. The message is displayed during the initiation of the engine test. When finished, the printer goes online.

Action:
No action required.

CLEARING PAPER FROM PRINTER

Description:
The printer has jammed or was turned on and media was detected in the paper path. The printer is attempting to clear these pages.

Action:
No action required.

CLOSE FRONT DUPLEX DRAWER

Description:
The duplex drawer is not completely closed.

Action:
Close the duplex drawer.

CLOSE MIDDLE FRONT DRAWER

Description:
The drawer that holds the intermediate transfer belt is open. Switch SW1 (refer to Figure 7-26) indicates the drawer is open. When the drawer is closed, a plastic protrusion on the lower left corner of the drawer pivots an arm allowing SW1 to toggle to the open position.

Action:

1. Close the middle front drawer.
2. If the message persists, remove the printer's left-side cover and inspect the mechanical linkage that closes SW1.
3. Refer to the wiring diagram to verify the wiring; the two-wire connector should be firmly seated to SW1 and the wiring harness should be firmly seated to connector J1003 of the DC controller PCB.
4. If the message persists, use an ohmmeter to verify functionality of SW1.

Table 7-1 Alphabetical printer error messages (continued)

CLOSE UPPER REAR DRAWER

Description:
Switch SW5 (refer to Figure 7-24) monitors the closing of the printer's upper rear door (this door allows you to access the fusing assembly). When the fusing door is closed, a tab on the rear door pushes a door switch actuator that runs along the left-side of the printer and closes SW5.

Action:

1. Close the upper rear drawer.
2. If the message persists, remove the printer's left-side cover and inspect the mechanical linkage of SW5 and lever.
3. Refer to the wiring diagram and verify all connections (J103 of the DC controller PCB and to SW5). Verify they are firmly seated.
4. Verify that both the front upper and middle drawers are firmly closed; closing these drawers also closes SW4 (see Figure 7-22).

Note Closing the rear door and the upper and middle front drawers closes SW4 and SW5. When either of these switches are open, open +24B VDC is disabled. This safety feature protects the operator from any high voltages.

CLOSE TOP COVER

Description:
SW2 (refer to Figure 7-24 indicates whether or not the printer's toner cartridge access door is closed. When the toner cartridge door is closed a lever is pushed down. This in turn rotates a pivot forward, opening the top cover switch (SW2).

Action:

1. Close the top cover.
2. If message persists, remove the printer's top cover and verify all mechanical linkages associated with SW2 (see figure 7-20).
3. Verify that the connector on J1003 of the DC controller PCB is firmly seated.

CLOSE UPPER FRONT DRAWER

Description:
The drawer that holds the imaging drum is open. Switch SW3 (refer to Figure 7-26) indicates that the drawer is open. When the drawer is closed a plastic protrusion on the lower left corner of the drawer pivots an arm that allows SW3 to toggle to the open position.

Action:

1. Open the drawer and firmly push the drawer closed using one hand in the middle of the drawer..
2. If the message persists, remove the printer's left-side cover and inspect the mechanical linkage that closes SW3.
3. Refer to the wiring diagram and verify the wiring; the two-wire connector should be firmly seated to SW3 and the wiring harness should be firmly seated to connector J1003 of the DC controller PCB.
4. If message persists, use an ohmmeter to verify functionality of SW3.

Note Closing the drawer also closes SW4 (the front drawer switch). When SW4 open +24B VDC is disabled. This safety feature protects the operator from any high voltages when the upper or middle front drawers are open.

Table 7-1 Alphabetical printer error messages (continued)

COLD RESET	
Description: The cold reset powerup sequence has been entered.	**Action:** Most printer variables will reset to their factory default values.
CONTINUOUS PAGE PRESS CANCEL JOB	
Description: The printer configuration page is being printed continuously.	**Action:** Press [Cancel Job] to terminate continuous configuration page printing and return the printer to the READY state.
DENSITY SENSOR OUT OF RANGE alternates with CLEAN DENSITY SENSOR	
Description: A density sensor out of range error was detected during a color calibration.	**Action:** The density sensor may be dirty. Inspect and clean the sensor. **See "Cleaning the toner density sensor" on page 76.**
DATA RECEIVED	
Description: The printer has received and processed data and is waiting for a form feed.	**Action:** Load appropriate media to continue print job.
DIAGNOSTICS MODE	
Description: The extended diagnostics power-up key sequence has been entered. Refer to the diagnostics procedures at the end of this chapter.	**Action:** No action required.
DRUM ERROR REPLACE DRUM KIT	
Description: An error has been detected with a component of the print drum kit.	**Action:** Replace the drum kit.
DRUM LIFE LOW REPLACE DRUM KIT	
Description: Approximately 80 % of the drum's life has been consumed.	**Action:** Drum replacement will be required in the near future.

Table 7-1 Alphabetical printer error messages (continued)

DRUM LIFE OUT **REPLACE DRUM KIT**	
Description: The imaging drum has reached the end of its expected life.	**Action:** Replace the print drum kit.
DUPLEXER ERROR **CHECK DUPLEXER**	
Description: An error has occurred in the duplex printing accessory.	**Action:** Verify that the duplex printing accessory is correctly installed and plugged in.
EIO X **INITIALIZING YYY** **alternates with** **DO NOT POWER OFF**	
Description: The EIO device in slot X is initializing. The YYY value will increment every 10 seconds during this process.	**Action:** No action required.
EIO X **NOT FUNCTIONAL**	
Description: The EIO slot specified does not have a card installed or is not functional.	**Action:** No action required.
EVENT LOG EMPTY	
Description: SHOW EVENT LOG was selected from the Information menu, but the event log has no entries.	**Action:** No action is required.
FUSER LIFE LOW **REPLACE KIT**	
Description: Approximately 95 % of the fuser's life has been consumed.	**Action:** Continue printing, or replace the fuser kit. Fuser replacement will be required in the near future
FUSER LIFE OUT **REPLACE KIT**	
Description: The fuser has reached the end of its expected life.	**Action:** Replace the fuser kit.
INITIALIZING	
Description: The message is displayed when the printer is initially turned on.	**Action:** No action required.

Table 7-1 Alphabetical printer error messages (continued)

INSTALL DRUM KIT

Description:
The drum kit is not installed or is incorrectly installed.

Action:
Verify that the drum kit is correctly installed.

INSTALL TRAY 2

Description:
Printer cannot print until media is loaded into Tray 2. The paper path for Tray 3 passes through Tray 2.

Action:
Insert Tray 2 into the printer so that printing from Tray 3 can continue/start.

MEMORY FULL
STORED DATA LOST

Description:
The printer has no available memory. The current job may not print correctly. Some downloaded fonts may have been deleted.

Action:
Try printing simplified pages. If this does not resolve the problem, add printer memory.

MEMORY SETTINGS CHANGED

Description:
The I/O buffering settings were changed by the printer because there is not enough memory available to use the previous settings.

Action:
No action is required. However, adding printer memory may prevent this from occurring.

MEMORY SHORTAGE
JOB CLEARED

Description:
The available memory was not enough to continue printing. The remainder of the job was canceled.

Action:
Adding printer memory may prevent this from occurring.

MEMORY SHORTAGE
PAGE SIMPLIFIED

Description:
The printer's adaptive data compression had to resort to lossy compression to fit raster graphics in the available memory. This has caused a data loss in the raster output.

Action:

1. Reduce the complexity of the page to improve the print quality.
2. Adding memory will not correct this problem.

NO JOB TO CANCEL

Description:
[Cancel Job] was pressed but there is no active job or buffered data to cancel. The printer automatically returns to the READY state.

Action:
No action required.

OFFLINE

Description:
The printer is offline and there are no error messages pending.

Action:
Press [Go] to return the printer to the READY state.

Table 7-1 Alphabetical printer error messages (continued)

PAGE CANNOT PRINT NOW alternates with RETRY WHEN PRINTING STOPS

Description:
An internal page has been requested while the printer is printing an incoming job. Interrupting the job to print the internal page would corrupt the job's environment and potentially cause the job to finish printing incorrectly after the internal page is completed. Consequently, internal pages are not permitted to interrupt jobs and can only be printed when the printer is idle.

Action:
Retry print job after printer has completed current job.

PAGE SIMPLIFIED

Description:
The printer's adaptive data compression had to resort to lossy compression to fit raster graphics in the available memory. This has caused a data loss in the raster output.

Action:

1. Reduce the complexity of the page to improve the print quality.
2. Adding memory will not correct this problem.

PAGE TOO COMPLEX TO PRINT alternates with PRESS GO TO CONTINUE

Description:
The page could not be printed.

Action:

1. Press [Go] to continue printing (with noticeably poor results on this page).
2. Press [Cancel Job] to terminate the entire job.
3. Reducing the complexity of the page may allow it to print successfully.
4. Adding memory will not correct this problem.

PLEASE WAIT

Description:
The printer is in the process of purging data so that it can go offline or into the menus.

Action:
No action required.

POWERSAVE ON

Description:
The printer is in PowerSave mode. This message is cleared by pressing any key or by the receipt of a print job.

Action:
No action required.

Table 7-1 Alphabetical printer error messages (continued)

PRESS GO TO PRINT alternates with PRESS SELECT TO CHANGE TONER	
Description: The top cover was opened and closed when the printer was not in toner cartridge replacement mode.	**Action:** Press [Go] to resume printing or press [Select] to enter the toner replacement menu.
PRINTER LANGUAGE NOT AVAILABLE.	
Description: The printer received a request for a new language (personality) that does not exist in the printer.	**Action:** No action required.
PRINTING CALIBRATION PAGE	
Description: The color calibration page is being generated. The printer returns to the READY stage upon completion of this page.	**Action:** No action required.
PRINTING CONFIGURATION	
Description: The configuration page is being printed. The printer returns to the READY stage upon completion of this page.	**Action:** No action required.
PRINTING FONT LIST	
Description: A typeface list for the available personalities is being printed. The printer returns to the READY stage upon completion of these pages.	**Action:** No action required.
PRINTING MENU MAP	
Description: The printer menu map is being printed. The printer returns to the READY state upon completion of this page.	**Action:** No action required.
PRINTING REGISTRATION PG	
Description: The registration page is being generated. The printer returns to the READY state upon completion of this page.	**Action:** No action required.

Table 7-1 Alphabetical printer error messages (continued)

PRINTING LASERJET DEMO

Description:	Action:
The registration page is being generated. The printer returns to the READY state upon completion of this page.	No action required.

PRINTING LASERJET DEMO 2

Description:	Action:
The registration page is being generated. The printer returns to the READY state upon completion of this page.	No action required.

PRINTING ACCESSORIES

Description:	Action:
The registration page is being generated. The printer returns to the READY state upon completion of this page.	No action required.

PRINTING COLOR GUIDE

Description:	Action:
The registration page is being generated. The printer returns to the READY state upon completion of this page.	No action required.

PROCESSING JOB

Description:	Action:
The printer is processing the current job.	No action required.

READY

Description:	Action:
The printer is online and ready to receive data, and no status or device attendance messages are pending.	No action required**.**

REINSTALL TRANSFER BELT

Description:
This message occurs if you do not have the intermediate transfer belt installed in the printer or if the home position marks (on the ITB) are not detected by sensor PS5.

Note The intermediate transfer belt must be rotating before PS5 is able to detect the “home positioning” marks on the ITB. Both the ITB and the imaging drum are driven by drum motor (M4)

Action:

1. Check SW1 for correct operation and make sure the cables are connected.
2. Verify that the ITB is installed in the printer.
3. If the ITB is installed and seated properly, verify that PS5 is not damaged. PS5 is located on the ITB assembly (see Figure 7-16). If the sensor appears damaged replace the entire ITB assembly.
4. Clean PS5.
5. Verify all wiring within the ITB drawer. Note the connection on the ITB assembly (located on the front, lower, left-hand corner of the assembly). When the drawer is closed the connector “mates” with a receptacle connector on the drawer. Verify the connector and all wiring are in good condition.
6. Verify that the drum motor (M4) is rotating both the imaging drum and the ITB. If necessary use a light felt marker and identify a spot (outside the imaging area) on the edge of the imaging drum. Power up the printer, then open the drawer to see if the mark have moved.
7. If the imaging drum is not rotating, verify the imaging drum connector is firmly seated into the connector J204 of the developing PCB.

REMOVE PAPER TOP OUTPUT BIN

Description:
The top output bin holds 200 sheets of paper. Sensor PS9 (see Figure 7-16) along with its sensor flag detects the height of the output paper stack.

Action:

1. Verify that PS9 moves freely and its movement is not blocked (see Figure 7-16).
2. Verify PS9 is free of dust and debris (printer’s top cover must be removed to access sensor).
3. Verify all connectors are firmly seated. Refer to wiring diagram.

Note PS9 (a three wire sensor) plugs into a through-wall connector on the printer’s chassis and then into a 14 pin wire harness, which plugs into J206 on the developing PCB (see Figure 7-16). All signals from the developing PCB are routed to J201 on the developing PCB to J1017 on the DC controller PCB.

Table 7-1 Alphabetical printer error messages (continued)

RESETTING MEMORY

Description:
The printer is executing a memory reset. The printer returns to the READY state upon completion of this process.

Action:
No action required.

RESETTING VALUES FINISHED

Description:
The color calibration density values have been reset to their default values.

Action:
No action required.

RESTORING FACTORY SETTINGS

Description:
The printer is executing a RESTORE FACTORY SETTINGS or a COLD RESET.

Action:
No action required.

SELECT LANGUAGE

Description:
The language selection powerup key sequence has been entered. The printer will prompt the user to select a new control panel display language once it has completed its initialization process.

Action:
Select new language when prompted.

SERVICE MODE

Description:
The service mode powerup key sequence has been entered. The printer will remain in service mode until [Go] is pressed.

Action:
Press [Go] to end service mode.

TONER CMYK LOW

Description:
The toner cartridge specified is low on toner.

Action:
Printing will continue until a TONER OUT message appears. To change the toner cartridge now, press [Select].

TONER CMYK OUT alternates with PRESS SELECT TO CHANGE TONER

Description:
The toner cartridge specified is out of toner.

Action:

1. If the TONER OUT setting in the CONFIGURATION menu is set to OVERIDE, pressing [Go] will resume printing.
2. Press [Select] to enter the toner replacement menu. Press [Go] to resume printing without changing the cartridge.

Table 7-1 Alphabetical printer error messages (continued)

TONER CMYK LOW alternates with PRESS SELECT TO CHANGE TONER	
Description: The toner cartridge specified is low on toner and must be replaced.	**Action:** Press [Select] to enter the toner replacement menu.
TONER POSITION [COLOR] = [STATE]	
Description: Indicates the current state of a particular toner cartridge. This message is displayed when Select is pressed while a TONER LOW/OUT message is displayed.	**Action:** If necessary, replace the specified toner cartridge.
TRANSFER KIT LOW REPLACE KIT	
Description: The transfer kit is near the end of its expected life.	**Action:** Although printing can continue, the transfer kit should be replaced for optimum printer operation.
TRANSFER KIT OUT REPLACE KIT	
Description: The transfer kit has reached the end of its expected life.	**Action:** Replace the transfer kit.
TRAY X EMPTY [TYPE] [SIZE]	
Description: The specified tray is empty but the current job does not require this tray to complete the job.	**Action:** No action is required. However, loading the proper media type and size into the tray will avoid this message in the future.
TRAY X LOAD [TYPE] [SIZE]	
Description: The specified media type and size need to be loaded into the requested tray.	**Action:** Load the specified media type and size into the requested tray. Press [Go] to override this request and cause the page to be printed on different media.

Table 7-1 Alphabetical printer error messages (continued)

TRAY X SIZE [SIZE]

Description:
Media has been loaded into Tray 1. The most recently configured size will be displayed with an asterisk next to it.

Action:

1. [Value +] and [Value –] may be used to view all possible sizes.
2. Pressing [Select] will select the currently displayed size. Pressing [Go] will remove the message.

TRAY X TYPE [TYPE]

Description:
Media has been loaded into Tray 1. The most recently configured type will be displayed with an asterisk next to it.

Action:

1. [Value +] and [Value +] may be used to view all possible types.
2. Pressing [Select] will select the currently displayed type. Pressing [Go] will remove the message.

TRAY X OPEN

Description:
The specified tray is not completely closed.

Action:
Close the specified tray.

WARMING UP

Description:
The fuser is warming up. Printing will continue when the fuser reaches the optimum temperature.

Action:
No action is required.

WASTE TONER FULL REPLACE DRUM KIT

Description:
Waste toner full sensor PS13 detects a waste toner full condition. Light receiver and light pipe arrangement along with a window in the drum assembly look for a waste fill condition. Verify that sensors and light pipes are not blocked.

Action:

1. Replace the drum kit.
2. Check sensor, replace if defective.

Numerical printer error messages

Table 7-2 Numerical printer error messages

13.XX PAPER JAM

XX Description:

0 Jam in input feed area
1 Jam in fusing area
2 Jam in fusing area
3 Jam in duplex reversing unit
4 Jam in duplex feed unit
5 Jam in duplex paper feed area
6 Jam in duplex paper feed area
7 Jam in paper feed area
8 Door open jam
9 Irregular paper jam in paper path
10 Paper in the paper path is too short
11 Paper in the paper path is too long
(see page 240)

alternates with CHECK ALL REAR DOOR

Description:
Media is jammed in the rear paper path or rear duplexing area.

Action:

1 Open the rear duplex cover (if installed) and remove any jammed media.

2 Open the upper rear door and remove any jammed media.

alternates with CHECK MIDDLE FRONT DOORS

Description:
Media is jammed in the transfer belt area or media is not picking.

Action:

1 Open the middle front drawer and remove any jammed media.

2 Watch the pick roller to ensure it is turning.

alternates with CHECK FRONT DUPLEX DRAWER

Description:
Media is jammed in the front duplexing area.

Action:
Open the front duplex drawer and remove any jammed media.

Table 7-2 Numerical printer error messages (continued)

13.1 PAPER JAM alternates with CHECK IN REAR OF DRAWER	
Description: A jam has occurred inside the middle front drawer area.	**Action:** Open the middle front drawer and carefully inspect for and remove any jammed media.
13.1 PAPER JAM OPEN MIDDLE FRONT DRAWER alternates with CHECK IN REAR OF DRAWER	
Description: A jam has occurred inside the middle front drawer area. The jam may be located in the fuser area or between the transfer area and the fuser.	**Action:** **1** Open the middle front drawer and carefully inspect for any media. **2** Be sure to inspect the fusing area. You may need to access the fusing area through the rear door. **3** Remove any jammed media.
20 INSUFFICIENT MEMORY alternates with PRESS GO TO CONTINUE	
Description: More data has been received from the computer than fits in the printer's internal memory.	**Action:** **1** To continue printing, press [Go]. Only the amount of data that fits in the printer's internal memory is printed. **2** To cancel the job, press [Cancel Job]. **3** Add more memory to resolve the problem.
22 EIO X BUFFER OVERFLOW alternates with PRESS GO TO CONTINUE	
Description: The EIO buffer for the EIO card in slot "X" has overflowed during a busy state.	**Action:** **1** The current data in the print buffer will be lost. **2** Press [Go] to resume printing and then resend the job.

Table 7-2 Numerical printer error messages (continued)

22 PARALLEL IO BUFFER OVERFLOW alternates with PRESS GO TO CONTINUE

Description:
Indicates the parallel buffer has overflowed.

Action:

1. The current data in the print buffer will be lost.
2. Press [Go] to resume printing and then resend the job.

40 EIO X DATA ERROR alternates with PRESS GO TO CONTINUE

Description:
A connection with the card in the specified slot has been broken.

Action:

1. Check that all cables are connected to the EIO ports and that the EIO board is seated properly.
2. If possible, print to another network printer to verify the network is working properly.
3. All data in the print buffer will be lost.

41.3 UNEXPECTED PAPER SIZE alternates with CHECK PAPER IN TRAY X

Description:
A tray is configured for a specific paper size, but the sheet loaded is a different size. This error often occurs when the printer is multifeeding.

Action:

1. Load the requested size media in tray.

Table 7-2 Numerical printer error messages (continued)

41.5 UNEXPECTED PAPER TYPE alternates with CHECK PAPER IN TRAY X	
Description: A tray is configured for a specific media type, but the printer detects a different media type loaded. The most common cause for this error is a paper jam at registration plate (under the ITB) where the customer does not remove the paper. The engine tries to check the OHT sensor and receives an error.	**Action:** **1** Verify that the correct media is loaded in the input tray and the printer control panel is configured correctly. **2** Clean the detection windows of OHT sensors 1 and 2 (see Figure 7-19).
49.ERROR XXXX CYCLE POWER	
Description: Indicates that a critical firmware error has occurred. An invalid command or data was sent to the formatter causing the processor to stop. This is the last action taken by the processor. The most likely cause of this error is invalid data or a bad command which was sent to the printer. A poor quality parallel cable, connection, or home grown application have been known to cause this error.	**Action:** **1** Verify that all cables are connected. **2** Turn the printer off and on to reset the printer. **3** Cancel all print jobs then resend. Try to isolate any offending print job. **4** If the formatter pan assembly or DC controller was removed, make sure the ribbon cable between the DC controller and the interconnect PCB is connected.

Table 7-2 Numerical printer error messages (continued)

50.X FUSER ERROR

Description:
The fusing assembly contains two heating bulbs, two thermo-switches, and two thermistors. AC power is provided to the fusing assembly via the DC power supply which is controlled by the DC controller PCB. The thermistors monitor the temperature of the fusing assembly and provide feedback to the DC controller PCB to regulate the fusing temperature. The two thermo-switches are wired in series with the fusing bulbs and “open” if the temperature exceeds 240° C.

X Description:

1 Low temperature error
2 Fuser warm-up service
3 High fuser temperature
4 Faulty fuser
5 Fuser voltage mismatch (verify that you have NOT installed a 110V fuser in a 220V printer or vice-versa!).
6 Fuser heater cutoff
7 Fuser motor malfunction (see recommended action for 50.7 Fuser error).

Action:

Note A visual check to determine if the fusing assembly is functional can be made by defeating the rear door interlock switch (see Figure 7-28) by pressing in on the white plastic above the left rear corner of the fan and then powering on the printer. If the fusing bulbs and thermo-switches are good, you should observe light from the lower fusing bulb as the printer warms up.

1 Turn the printer off and on to reset the printer. If the error persists, try re-installing the fusing assembly. If the error continues to persist, proceed to step 2.

2 Turn the power off and remove the fusing assembly. Measure the resistance between pin 3 and pin 4. The resistance should be between 6+/-2 ohms. If there is no continuity between pins, it may be assumed that either a heating bulb and/or a thermo-switch is “open”. Replace the fusing assembly. If resistance limits were acceptable, proceed to step 3.

3 Referring to Figure 7-31, measure the resistance for both the upper and lower thermistors. The resistance should be between 430K ohms and 310K ohms at room temperature (25° C). If the resistance exceeds limits, replace the fusing assembly. If resistance is within limits proceed to step 4.

4 Verify the connectors at J1011 of the DC controller PCB and J1 of the Low voltage power supply assembly are firmly seated.

5 Replace the power supply assembly.

Table 7-2 Numerical printer error messages (continued)

50.7 FUSER ERROR

Description:
The fusing motor (M1) provides drive for the fusing assembly, the “web” paper transfer belt, transfer belt/drum contact clutch, secondary transfer roller, roller clutch, face-down output delivery, and the stacker rollers. A 50.7 fuser error is displayed when no motion is detected. Photosensor PS6 (the fusing unit pressure switch, refer to Figure 7-18) provides feedback regarding fusing unit motion.

Action:

1. Power cycle the printer to try to clear the message.
2. Remove the left-side cover of the printer. Verify that the fusing motor (M1) connector is seated firmly into J102 of the feed PCB.
3. Ensure connector at J110 of the feed PCB is firmly seated (this connector contains the wiring for PS6 which provides fuser motion feedback).

Note Closely inspect the mechanical linkage. The gears along the gear “drive” path may bind the gears. This will prevent M1 from rotating.

4. If the error persists, Observe the drive shaft of M1 (refer to Figure 7-26) while powering on the printer. If this shaft DOES NOT rotate, your failure is related to the motor drive circuitry. Referring to the printer’s wiring diagram, verify that connectors J102 and J106 of the feed PCB are firmly seated. If the error still persists, replace the fusing motor and then Feed PCB in sequence.
5. If the shaft rotates (both forward and reverse), and the 50.7 fuser error is displayed, the cause of the error is related to the motion feedback circuitry. Remove the fusing assembly and verify the sensor flag (see Figure 7-22) is in good condition and functional. Verify the connector at sensor PS6 (see Figure 7-22) is firmly seated; clean the sensor of dust and debris. If the error persists replace sensor PS6.

51 LASER ERROR

Description:
Indicates that a laser malfunction has occurred due to a beam detect error or laser failure.

Action:

1. Turn the printer off and on to reset the printer.
2. Reconnect laser driver PCB connector J1102 and the DC contoller PCB connector J1008 correctly.
3. Replace the laser/scanner unit.
4. Reconnect BD PCB connector J551 and the DC controller PCB connector J1006 correctly.

Table 7-2 Numerical printer error messages (continued)

52 SCANNER ERROR

Description:
Indicates that the scanner error has occurred.

Action:

1 Turn the printer off and on to reset the printer.

2 Reconnect the BD PCB connector J551, the scanner motor connector J1103, and the DC controller PCB connector J1006 correctly.

3 Replace the laser/scanner unit.

53.XY.ZZ PRINTER ERROR

Description:
Indicates a memory error. If a DIMM caused the error, the DIMM will not be recognized (configured).

X = MemoryType
0 = ROM
1 = RAM

Y = Device Location
0 = Onboard
1 = DIMM slot 1
2 = DIMM slot 2
3 = DIMM slot 3

ZZ = **Error Number**
0 = Unsupported memory
1 = Unrecognized memory
3 = Failed RAM test

Action:

1 Verify that the DIMM board is installed correctly and the DIMMs are configured correctly. DIMMs must be installed in synchronous pairs in adjacent slots, with the same size and speed in both slots.

2 Turn the printer off and on to reset the printer.

3 Remove and replace the DIMM that caused the error.

54.1 PRINTER ERROR

Description:
Indicates that an internal power failure has occurred.

Action:

1 Power printer off and on.

2 Replace the high voltage power supply.

Table 7-2 Numerical printer error messages (continued)

54.2 PRINTER ERROR

Description:
Drive motor (M3) provides drive for the toner cartridge carousel. If motion is not detected a 54.2 error is displayed. M3 is a 6-phase stepping motor and receives its drive signal from J203 of the Developing PCB. Photosensor PS10 monitors “movement” (and the position) of the toner cartidge carousel. Different width tabs (four tabs, one for each cartridge) on the left-end of the carousel housing pass through PS10 to provide positioning information. The black toner cartridge tab is the “home” position.

Action:

1. Turn the printer off and then on to reset the printer.
2. Open the color toner door and look for an obstruction. If necessary, remove the toner cartridges individually by manually releasing the carousel brake and rotating the carousel around to each cartidge position and remove the cartridges. Turn the printer off and on to reset the printer.

Note The printer CANNOT operate with the top cover removed unless the carousel brake has been released or removed.

3. Verify the carousel drive motor wiring harness is firmly seated into connector J203 of the developing PCB (see Figure 7-34).
4. Verify PS10 (refer to Figure 7-26) is working correctly and not excessively dirty (clean if necessary) and that the wiring harness is firmly seated into both the sensor assembly, and into connector J206 of the developing PCB.
5. Verify all connectors to the developing PCB and the DC controller PCB are firmly seated.

54.3 PRINTER ERROR

Description:
The printer is NOT receiving data back from the density sensor (PS14). PS14 is located in the bottom of the imaging drum drawer (refer to Figure 7-25). During calibration routines, a series of images are written on the imaging drum and the densitometer measures the density of the image (e.g. amount of toner which is placed into the drum). These measurements provide the feedback to ensure image quality is consistent throughout the life of the consumable.

Action:

1. Verify the densitometer is clean; perform the toner density sensor cleaning procedure provided in Chapter 7 of the online user guide.
2. Inspect the density sensor wiring harness for damage. The harness runs from the density sensor through the left-side upper control arm of the imaging drum drawer to J1010 of the DC controller PCB. Verify the cable is firmly seated into the J1010 of the DC controller PCB.
3. If the error persists, replace the density sensor assembly.

Table 7-2 Numerical printer error messages (continued)

54.4 PRINTER ERROR

Description:
Optional equipment is not recognized.

Action:
Turn the printer off and on to reset the printer.

54.5 PRINTER ERROR

Description:
Indicates a waste toner sensor malfunction.

Action:

1. Turn the printer off and on to reset the printer.
2. Remove the drum cartridge and clean the waste toner detection window with a dry cloth.
3. Clean the waste toner sensor unit at the printer side with a dry cloth.
4. Reset the light guide, or replace it if scarred or damaged.
5. Reconnect the waste toner sensor unit connector and the DC controller PCB connector (J1009) correctly.
6. Replace the waste toner senso (PS13).

54.6 PRINTER ERROR

Description:
The print OHT sensor has malfunctioned.

Action:

1.
2. Check connection.
3. Replace sensor.

55 DC CONTROLLER ERROR

Description:
The print engine is not communicating with the formatter.

Action:

1. Turn the printer off and on to reset the printer.

57.1 FAN FAILURE

Description:
The printer detected that the fan (an exhaust fan located in the upper, left rear corner of the printer, refer to Figure 7-28) was not rotating. This fan operates off +24Vdc and is enabled by the DC controller PCB's micro-processor.

Action:

1. Turn the printer off and on to reset the printer. Visually check to see if the fan is rotating (if you cannot see any rotation, place your hand over the outlet vents to see if exhaust air is moving).
2. Remove the printer's left-side cover. Check to see if anything is preventing the fan from rotating freely.
3. Verify that the fan's connector is firmly seated into connector J208 of the Developing PCB.
4. If the error persists, replace fan.

Table 7-2 Numerical printer error messages (continued)

57.2 FAN FAILURE

Description:
The printer detected that the fan (an exhaust fan located in the upper, right rear corner of the printer, refer to Figure 7-29) was not rotating. This fan, operates off +24Vdc and is enabled by the DC controller PCB's micro-processor.

Action:

1. Turn the printer off and on to reset the printer. Visually check to see if the fan is rotating (if you cannot see any rotation, place your hand over the outlet vents to see if exhaust air is moving).
2. Remove the printer's left-side cover. Check to see if anything is preventing the fan from rotating freely.
3. Verify that the fan's connector is firmly seated into connector J209 of the developing PCB.
4. If the error persists, replace fan.

57.3 FAN ERROR alternates with CLOSE UPPER FRONT DRAWER

Description:
The intake fan is located in the front, center of the upper front drawer (refer to Figure 7-27). Fan rotation stops when the drawer is opened. A fan error is displayed when fan motion is NOT detected by the DC controllers micro-processor if the drawer is closed and the printer is not in PowerSave mode.

Action:

1. Turn the printer off and on to reset the printer. Due to the difficulty of observation, listen to hear if the fan is rotating.
2. Verify the fan connector is firmly seated into connector J1022 of the DC Controller PCB.
3. If the error persists, replace the fan.

62 NO SYSTEM

Description:
Indicates there is a printer firmware problem.

Action:

1. Turn the printer off and on to reset the printer.
2. Reseat the firmware DIMM.

62.X PRINTER ERROR

Description:
Indicates that a problem exists with the internal memory.

X = Description
0 = Internal memory
1-3 = DIMM slots 1-3.

Action:

1. Turn the printer off and on to reset the printer.
2. Reseat and then replace the DIMM.
3. Replace the formatter board.

62.M BAD MPTR

Description:
The firmware ran out of memory trying to build the static entity directory.

Action:

1. Check printer settings to determine which values have been changed
2. Clear the message by pressing [Go].

Table 7-2 Numerical printer error messages (continued)

68 NVRAM ERROR CHECK SETTINGS

Description:
One or more settings saved in the non-volatile storage device are invalid. Some settings may have been reset to factory defaults.

Action:

1. Check printer settings to determine which values have been changed.
2. Clear the message by pressing [Go].

68 NVRAM FULL CHECK SETTINGS

Description:
Indicates that a non-volatile storage device is full. Some settings may have been reset to factory defaults.

Action:

1. Check printer settings to determine which values have been changed
2. Clear the message by pressing [Go].

79 SERVICE (XXXX) PRINTER ERROR

Description:
A hardware error has occurred.

X Description
01XX = IO ASIC register error
02XX = video ASIC register error
03XX = IDE ASIC register error

Action:

1. Reseat the formatter.
2. Reseat the firmware DIMM.
3. Run formatter diagnostics.
4. Replace the firmware Dimm
5. Replace the formatter.

80 SERVICE (XXXX) EIO ERROR

Description:
A critical EIO failure has occurred. X indicates the slot number of the device. XXXX indicates the error type.

Action:

1. Turn the printer off and on to reset the printer.
2. Reseat the EIO card.
3. Replace the EIO card.

Paper path troubleshooting

Paper jams

Paper jams are posted if paper fails to arrive at or clear the paper path sensors in the allowed time. Dedicated paper sensors (PS2, PS7, PS3101, PS3103, and PS3104) detect whether paper is present in the sensor and if the paper is fed normally (see Figure 7-3). When the control board detects a paper jam, it immediately stops the printing process and displays the appropriate paper jam message for the sensor that detects the paper jam.

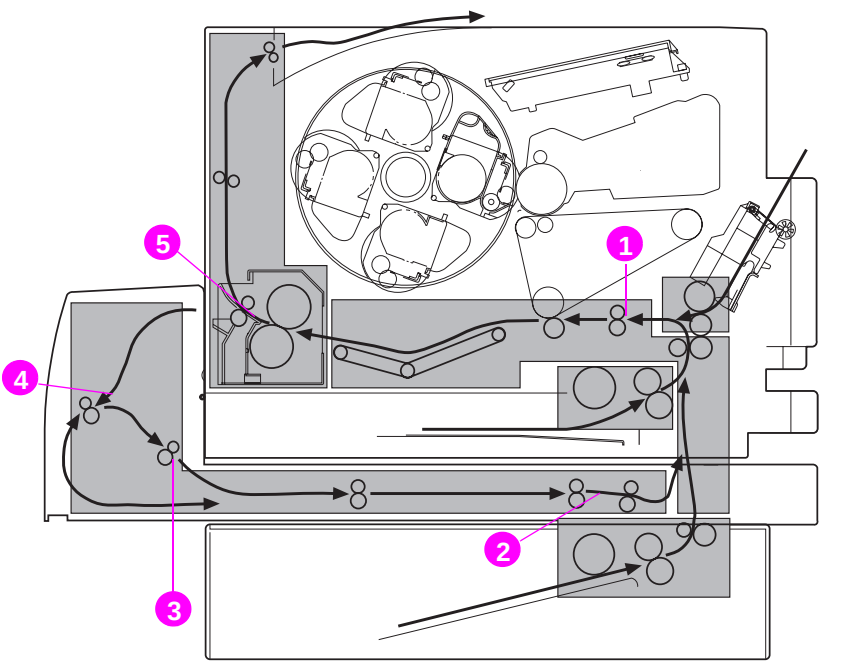


Figure 7-3 **Paper jam sensors** **(shown with the optional 500-sheet paper feeder and duplex printing accessory installed)**

1 Registration paper sensor (PS2)
2 Duplex paper-pick sensor (PS3104)
3 Reversed unit paper sensor (PS3103)
4 Reversed paper sensor (PS3101)
5 Delivery paper sensor (PS7)

Paper jam locations

Use Figure 7-4 to troubleshoot paper jams in the printer. For instructions on clearing paper jams, see the sections later in this chapter.

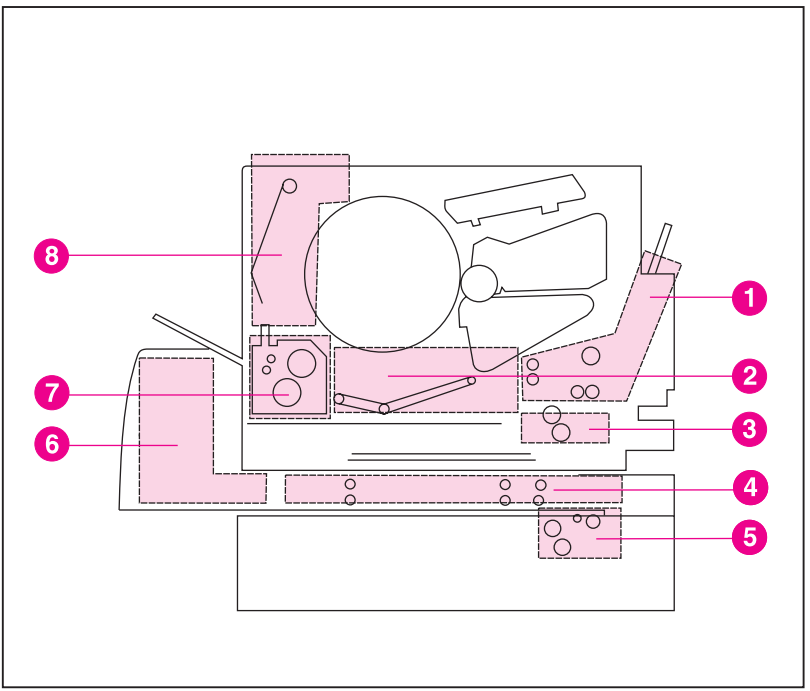


Figure 7-4 **Paper jam locations** **(shown with the optional 500-sheet paper feeder and duplex printing accessory installed)**

1 Input tray 1 area
2 Transfer belt area
3 Input tray 2 area
4 Front duplex drawer area
5 Tray 3 (500-sheet paper feeder) area
6 Rear duplex cover area
7 Fuser area
8 Rear paper path area

General paper path checklist

- Verify that media is correctly loaded in the input trays and that all length and width guides are set correctly.
- Clean the printer. Toner and paper dust in the paper path inhibit free movement of media through the printer and block the sensors.
- Vary the input and output selections of the printer to determine if the problem is associated with a particular area of the printer.
- Worn separation pads on the multi-purpose tray cause multifeeds. Check the condition of the pickup rollers and customer replaceable feed roller. Bent separation tabs cause misfeeds and multifeeds. Replace the tray if necessary.
- Defective paper tray switches can cause paper jams by indicating the wrong size paper to the formatter.
- Scraps of paper left in the paper path can cause intermittent paper jams. Always check that the paper path is clear when cleaning the printer and when clearing paper jams. Also, remove the fuser and carefully check it for jammed paper.
- There are three areas in which scraps of paper may be difficult to find.
  - The ITB drawer connector on the engine side.
  - The OHT sensor under the registration plate.
  - The fuser. Remove the fuser and check it carefully.
  - Sometimes in the center of the web transport before the fuser.

Print media checklist

Many print problems are caused by printing on media that does not meet specifications. The *HP LaserJet Printer Family Paper Specifications Guide* contains detailed information about media specifications, but the following list helps to quickly check common media-related printing problems.

- Rough paper causes poor transfer and smeared print problems. Check that the paper meets specifications for smoothness.
- The printer handles only 60 to 159g/m^2) (16 to 42-pound) bond media, and 5-mil (0.13 mm) thick transparencies.
- Paper that has absorbed moisture causes paper feed problems. If the printer is used in a humid area, suspect damp paper as a cause of recurring paper feed and print quality problems.

- Damaged paper, paper with ragged edges, or paper whose edges stick together cause paper jams.
- Using paper that has already been through a laser printer or a copier causes paper jams.

Paper jam recovery

This printer provides paper jam recovery, a feature that allows you to set whether the printer should attempt to automatically recover from paper jams. If paper jam recovery is enabled, when a paper jam occurs, all pages affected by the jam will be reprinted. The options are:

ON	Printer will attempt to reprint jammed pages.
OFF	Printer will not attempt to reprint jammed pages.

Note During the recovery process, the printer may reprint several good pages that were printed before the paper jam occurred. Be sure to remove any duplicated pages.

To enable paper jam recovery

1. Press [Menu] until CONFIGURATION MENU displays.
2. Press [Item] until JAM RECOVERY displays.
3. Press [Value] until ON displays.
4. Press [Select] to save the setting.
5. Press [Go] to return the printer to the READY state.

To improve print speed, you may want to disable paper jam recovery. To disable paper jam recovery, select OFF in step 3 above. If paper jam recovery is disabled, the pages involved in a jam will not be reprinted.

Image formation troubleshooting

Before beginning image formation troubleshooting, check that the media meets the specifications listed in the *HP LaserJet Printer Family Paper Specification Guide.*

Print density test and color checks

Use the configuration page to check the print density (the black levels). The configuration page has solid black-filled areas that demonstrate the ability to print black at full density. The configuration page also tests the ability to print each primary and process color. For information on printing a configuration page, see Figure 7-12 (see page 276).

In addition to the items listed above, the configuration page shows the following information:

- helps isolate the problem to the software or the printer
- shows that all colors print

The following media-related items are responsible for many image formation and print-quality defects:

- rough paper
- heavy paper
- transparencies out of the specified thickness range
- paper that has absorbed too much moisture from the atmosphere
- room environment (humidity too high or low)

Understanding color variations

The printed output may not match the computer screen, and the colors printed on successive pages may not match. While color variations are inherent in this printing method, they may indicate changes in the printing environment, print media, or printer components.

Common causes of color variation

The following list outlines the major causes of color variations between computers, applications, and output devices.

- Halftone patterns produced on monitors and the types of patterns used in the print jobs are different and might cause variations in the printed output.
- The printed output differs from the image on the monitor because the monitor and the print media have different reference values of black and white. The monitor screen has charcoal gray for the black level, and the white on the monitor screen is actually blue. Black on the print media is limited only by the fill capability of the printer, and most good quality paper has a very high white level. In addition, phosphor (used in color monitors) and toner have entirely different spectra characteristics and different color rendering capabilities. Differences between output are common. Blues generally match better than reds.
- The color of the ambient light changes the perception of color. Fluorescent light lacks many colors present in incandescent light, and the color range of natural light is broader than any artificial light. When comparing color, choose a standard light source for reference and understand that the perceived color will change as the light changes.
- Long term color variations occur as paper ages. Use high quality paper and protect the paper from sunlight to help minimize discoloration.
- Environmental changes can cause color variation. The development process places a high potential across an air gap to attract toner to the imaging drum. Changes in relative humidity vary the point at which the toner travels to the imaging drum.
- All consumable components have a finite life span, and as these components reach the end of their useful life, their ability to produce consistent print quality diminishes.
- Paper roughness can cause colors to appear different. Use standard paper.

Color selection process

The user selects the color in the application, but the operating system may convert or modify some characteristics of the color before sending the information to the printer driver. The printer driver may also modify color characteristics depending upon the selected output mode.

Any color characteristics not addressed by the printer driver or applications are set to the printer default. The default color may not match the color the user selected.

Customizing color output through printer drivers

The printer driver, which is installed with your printer software, enables your software applications to use the features of the printer. It also gives you customized control of color text, graphics, and photos.

The method of accessing your printer driver depends on your computer's operating system. For specific instructions on accessing printer drivers, see the printer driver's Readme file, which is included on the printing system CD-ROM.

The following color control features are available only through your HP printer driver. See the printer driver's online Help for details on color settings and their effect on printed output.

Halftone options

Halftone options affect the resolution and clarity of your color output. You can select halftone settings for text, graphics, and photos independently. The two halftone options are Smooth and Detail.

The Smooth option provides better results for large, solid-filled print areas. It also enhances photos by smoothing out fine color gradations.

The Detail option is useful for text and graphics that require sharp distinctions among lines or colors, such as images that contain a pattern or a high level of detail.

HP ColorSmart II

HP ColorSmart II default settings will produce optimum results for most color printing needs. However, you can also manually adjust color settings through the printer driver's Vivid color and Screen match color control options.

Vivid color

Vivid Color allows print to have a higher color saturation by putting more toner on the page, however, this may cause high potential for scatter.

Screen match

Screen Match (sRGB) (standard red-green-blue) prints colors that are close to those you see on your screen. Screen Match can be useful for retouching photographs or when you have created colors on your screen that you wish to reproduce, such as special colors for a company logo.

Note Factors such as the type of monitor you use and the room's lighting can affect the appearance of colors on your screen.

Print in grayscale

The Print in Grayscale option in the printer driver allows you to print documents using shades of gray in place of colors. This option is ideal for printing proofs of color documents, or for printing documents that will later be faxed or photocopied.

Matching colors

The process of matching printer output color to your monitor is quite complex because printers and computer monitors use different methods of producing color. Monitors *display* colors by light pixels using an RGB (red, green, blue) color process, but printers *print* colors using a CMYK (cyan, magenta, yellow, and black) process.

Color-matching factors

Several factors can influence your ability to match printed colors to those on your monitor. These factors include:

- print media
- overhead lighting
- personal differences in perception
- software applications
- operating system palettes
- monitors
- video cards and drivers

Matching PANTONE®* colors

In addition to controlling color through the printer driver, you can control color through PANTONE®* color matching.

PANTONE®* colors are certified RGB and CMYK values specified in the PANTONE®* color-matching system, which is supported in many graphics software applications. This color-matching system is useful for matching printer output to a specific color (for example, a logo). See the documentation for your software application for instructions on using PANTONE®* colors.

For more information on using PANTONE®* colors, see the Readme file for the PANTONE®* color-matching system included on the printing system CD-ROM.

Note Color settings, halftone settings, and print media affect the appearance of PANTONE®* colors. To achieve true PANTONE®*-certified colors, all components used, including the video driver, software application or printer driver, and the print media, must be PANTONE®*-certified.

Adjusting color balance

This printer features automatic color calibration to provide high-quality color output. In situations that require critical color control, you can manually adjust the density balance of the printer's four toner colors.

CAUTION This procedure should only be performed by your network administrator. Performing this procedure changes the color balance of the printer by altering halftones and affects *all* print jobs.

To adjust color balance

Step 1: Print a color balance calibration page.

The color balance calibration page (shown in Figure 7-5) displays current color settings and provides a record of the printer's initial settings before any adjustments are made.

1. Press [Menu] until `CALIBRATION MENU` displays.
2. Press [Item] until `PRINT CALIBRATION PAGE` displays.
3. Press [Select] to print the color balance calibration page. The page consists of four color bars (cyan, magenta, yellow, and black) and a box containing gray balance circles. The factory default setting for each color is zero. The range of settings is -5 to +5.

Note Adjusting densities using the four color bars provides coarse color balance adjustments. After making these adjustments, you can fine-tune color densities by adjusting the gray balance. (See step 7 for instructions.)

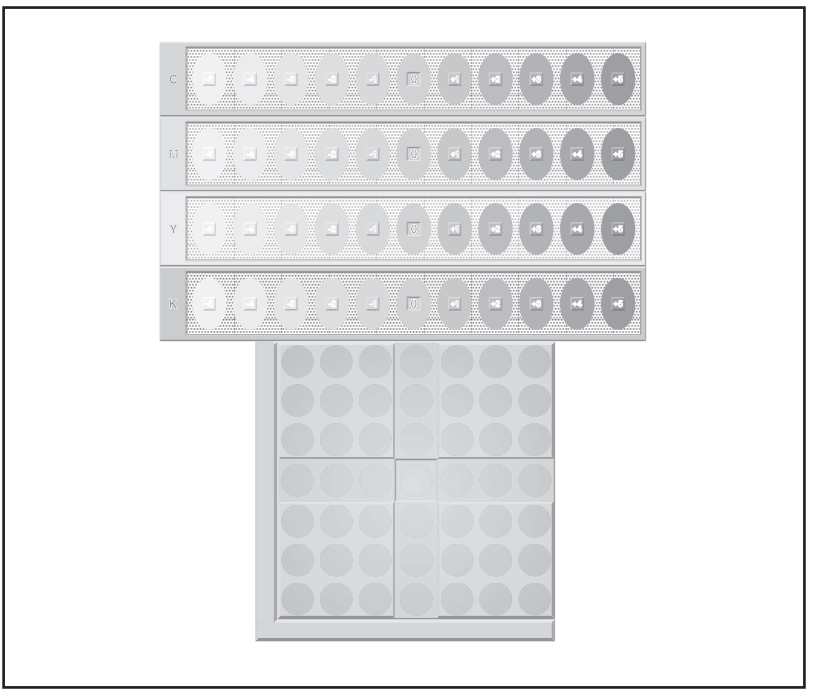


Figure 7-5 **Color balance calibration page**

Step 2: Adjust the cyan (C) density setting.

Examine the cyan density bar (C) on the color balance calibration page from a distance of 2 meters (6 ft). If the center oval matches the background pattern more than the other ovals, the cyan density does not need to be adjusted and you should continue on to the magenta (M) setting. If an oval left of center or right of center matches the background more than the center oval, use the following steps to enter the number:

1. Press [Item] until CYAN DENSITY displays.
2. Press the right side of the [Value] key to increase the value, or press the left side to decrease it, until the number corresponding to the oval that most closely matches the background pattern is displayed.

3 Press [Select] to save the value. An asterisk (*) displays next to the selected setting.

Step 3: Adjust the magenta (M) density setting.

Examine the magenta density bar (M). If the center oval matches the background pattern more than the other ovals, the magenta density does not need to be adjusted and you should continue with the next step. If not, use the following steps to adjust the density:

1 Press [Item] until MAGENTA DENSITY displays.

2 Press the right side of the [Value] key to increase the value, or press the left side to decrease it, until the number corresponding to the oval that most closely matches the background pattern is displayed.

3 Press [Select] to save the value. An asterisk (*) displays next to the selected setting.

Step 4: Adjust the yellow (Y) density setting.

Examine the yellow density bar (Y). If the center oval matches the background pattern more than the other ovals, the yellow density does not need to be adjusted and you should continue with the next step. If not, use the following steps to adjust the density:

1 Press [Item] until YELLOW DENSITY displays.

2 Press the right side of the [Value] key to increase the value, or press the left side to decrease it, until the number corresponding to the oval that most closely matches the background pattern is displayed.

3 Press [Select] to save the value. An asterisk (*) displays next to the selected setting.

Step 5: Adjust the black (K) density setting.

Examine the black density bar (K). If the center oval matches the background pattern more than the other ovals, the black density does not need to be adjusted and you should continue with the next step. If not, use the following steps to adjust the density:

1. Press [Item] until BLACK DENSITY displays.
2. Press the right side of the [Value] key to increase the value, or press the left side to decrease it, until the number corresponding to the oval that most closely matches the background pattern is displayed.
3. Press [Select] to save the value. An asterisk (*) displays next to the selected setting.

Step 6: Reprint the color balance calibration page. (See step 1.)

Step 7: Adjust gray balance.

Note Adjusting densities using the gray balance pattern allows you to fine-tune color balance. This process affects all four color bars.

Examine the gray balance circles in the box at the bottom of the color balance calibration page. If the circle in the center most closely matches the background pattern, then the gray balance does not need to be adjusted. If the circle does not match, use the following steps to adjust gray balance.

1. Locate the gray circle that most closely matches the background. The magenta (M) and yellow (Y) numbers associated with this circle indicate the optimum gray balance settings for these colors.
2. Adjust the magenta and yellow settings (yellow is horizontal and magenta is vertical) until the gray circle is in the middle. Use the values from the bars above to select the value to be entered.
3. After making adjustments to the magenta and yellow settings, press [Go] to return the printer to the READY state.

Image defects

Unless otherwise specified, all references in this section to horizontal or vertical directions of print quality problems refer to problems found on letter and A4-sized media.

Black/partially black pages

- Check for poor contact between the drum cartridge contact (for primary charging bias) and the primary charging bias contact. To improve the contact, clean the contacts. If the problem persists after cleaning or the contacts are deformed or damaged, replace the them. If the contacts have slipped off, adjust them correctly.
- Check the drum cartridge (primary charging roller). If defective, replace the drum cartridge.
- Check for poor contacts in the connectors. Reconnect the DC controller PCB connector and the high-voltage PCB 2 connector correctly.
- Check for a defective high-voltage PCB (primary charging bias output shortage). If defective, replace the high-voltage PCB 2.
- Check for a defective DC controller PCB. If defective, replace the DC controller PCB.
- Check for light leak.

Color missing

- Check for defective light pipe sensor. If defective, replace the toner level sensor.
- Remove the toner cartridge and manually check the level of toner in the toner cartridge.
- Check for defective development PCB. If defective, replace the development PCB.
- Check for defective DC controller PCB. If defective, replace the DC controller PCB.

Faded print, random faded areas

- The moisture content of you media may be uneven or too low. Use media from a different source or an new ream of paper.
- If some areas of the paper rejects toner, try using paper from a different source or from a new ream of paper.
- The media may be too rough and exceed media specifications. Check the media specifications listed on See “Supported media specifications” on page 15. Do not use paper that exceeds specifications.
- Check that the printing environment is within humidity specifications.
- Faded print could result from low toner in a particular toner cartridge. If a toner low or toner out message displays on the printer control panel, replace the appropriate toner cartridge.
- Check to see if the transfer belt is contaminated. Use a lint-free cloth to clean any contaminants from the transfer belt surface.

Irregular, raised spots or stray toner

- Toner collected on the transfer belt can cause smudging on the back of the page. Smudges commonly appear on the edges of pages after media size is changed. The belt is self-cleaning and the smudging will normally clear within a few pages.
- Toner on the edge of the media is usually caused by toner collecting on the paper guides. Inspect the paper guides and clean with a lint-free cloth if necessary.
- Do not re-feed paper that has already been through the printer. Re-feeding paper that has already passed through the printer can contaminate the fuser causing stray toner defects.
- Paper may have blobs first thing after warm-up, print a few pages to resolve the anomaly.

Banding and horizontal lines

Banding can be caused by:

- Old maintenance units
- Worn, damaged or contaminated gears
- Consumables that are beyond their rated life
- Improper consumable storage

If the problem persists:

- Print a configuration page to check the life of the consumables. Replace any consumable that is past its rated life.
- Because banding is more visible in some halftone patterns than others. Print a page using a halftone pattern such as “banddiag” provided in the Color Smart selection in the printer driver. If the defect occurs only once on a letter size sheet, try printing the pattern on a legal size sheet.
- Observe the following from the test sample...
  - The spacing or “pitch” between the defects.
  - Check to see if the defect in all color planes.
  - If the defect is in all color planes, does the defect produce a straight line through all color planes or does it move from one color plane to the next.
  - If the defect moves from one color plane to the next, measure the amount it moves. This movement amount is called the “precession”. Keep in mind the print order is K-M-C-Y. Measure the precession from K to M or M to C, not K to C.

Vertical bands or very dark backgrounds

- If problem persists following several pages of print, print a configuration page. Verify the remaining life of the imaging drum. Replace the imaging drum if necessary.

Vertical lines or streaks

- Check for circumferential scars on the photosensitive drum. If scars are present, replace the drum cartridge if line goes through all colors.
- Check for circumferential scars on the upper fusing roller. If scars are present, replace the upper fusing roller if line goes through all colors.
- Remove OPC cartridge and inspect main charger or OPC for a contaminate such as a fiber if line goes through all colors.

Note Drum is very light sensitive and should not be exposed for more than 20 seconds. Drum exposure to light for short periods can cause permanent damage to drum.

- If white lines or streaks appear only in the black areas of the printed media, print several configuration pages to clear the anomaly. If this does not clear the problem check the sleeve surface to confirm the defect, replace the black toner cartridge.
- White lines appearing only in a particular color, try printing several configuration pages to clear the error. If the error does not clear, check the sleeve surface to confirm the defect, then replace the toner cartidge for the color with the lines or streaks.

Wavy characters

Mechanical instability in the scanner mechanism or the optics can cause wavy characters. Reprint the job to ensure that the problem persists. If the failure remains, replace the scanner assembly.

Overhead transparency defects

Overhead transparencies may display any of the image quality defects shown in the previous samples. In addition, because transparencies are pliable while in the print path, they are subject to being marked by the media handling components.

- Make sure that transparency is checked as the media type in the Paper Tab in the printer drive. Also, make sure that the media input tray is correctly configured for transparencies. When Transparency is selected as the media type and ColorSmart II is selected on the Color tab, the printer will use a color treatment optimized for projection.
- If transparencies show lines and creases in the media and/or the printed output, compare the defect against the template to help isolate the cause to a particular component.
- Check that the transparencies meet the *specifications listed in the HP Paper Specifications Guide.*
- If the transparencies have spots or smudges, reprint them being careful not to touch the surface of the media. Skin oils can contaminate transparencies, causing spots and smudges.
- Small random dark areas on the trailing edge of solid fill pages may be caused by transparencies sticking together in the face up bin. Try printing the job in smaller batches.
- Printing is prefered only to the FD output. FD output leads to shocking of transparencies because of the speed that they come out.

Note Allow transparencies to cool at least 30 seconds before handling them.

Transparencies created on the printer may look bad, but still can be used on reflective-type (portable) transparency projectors.

Repetitive defects on transparencies

Overhead transparencies that have repetitive defects spaced about *131 mm (4.1 in)* apart indicate a defect on the upper fuser roller.

1 Power off and unplug the printer, allow 30 minutes for the fuser to cool, and remove the fuser.

CAUTION Make sure to allow 30 minutes before removing the fuser. The fuse will be hot.

2 Turn the fuser gears and inspect the surface of the upper fusing roller. If the roller has surface defects (gouges) replace the fusing assembly.

Black image only

1 This can be caused by improper timing on the ITB clutch gears. Make sure the timing marks on each gear are pointing at each other.

Dull or dark transparencies

If the transparency colors are dull or dark:

1 Ensure the transparencies meet the *specifications for this printer (part number C2934A for letter, and C2936A for A4)*.

Repetitive defects troubleshooting

Repetitive defects are defects that occur on the page. Most repetitive defects are caused by problems with one of the following:

- Developer roller
- Charge roller
- Cleaning roller
- Transfer roller
- Fuser
- Imaging drum
- Transfer belt

See Figure 7-6 for the repetitive defect ruler and Table 7-3 for defect pitch chart.

Imaging drum

Causes:

- Damage such as scratches or dents on the imaging drum. These usually appear as black or white marks on the page.
- Paper dust adhering to the imaging drum. These usually appear as white marks in the dark printed areas of the page.
- Exposure of portions of the imaging drum to light. This causes light sections in the printed output. The life of the imaging drum is shortened by exposure to light.

Actions:

- Print at least four configuration pages to determine if the defect repeats in the same horizontal orientation.
- Inspect the imaging drum for scratches, dents, or other damage. Replace if needed.
- If the problem is dust, remove the dust with 70% isopropyl alcohol applied with a hand wipe. Try this *only* if the print defect is unacceptable and the only other alternative is replacing the imaging drum.
- Defects caused by exposure to light might clear up over time. If severe, replace the imaging drum.

CAUTION Do not expose the imaging drum to light, and be careful not to scratch or get fingerprints on the drum surface during cleaning. Do not blow on the imaging drum.

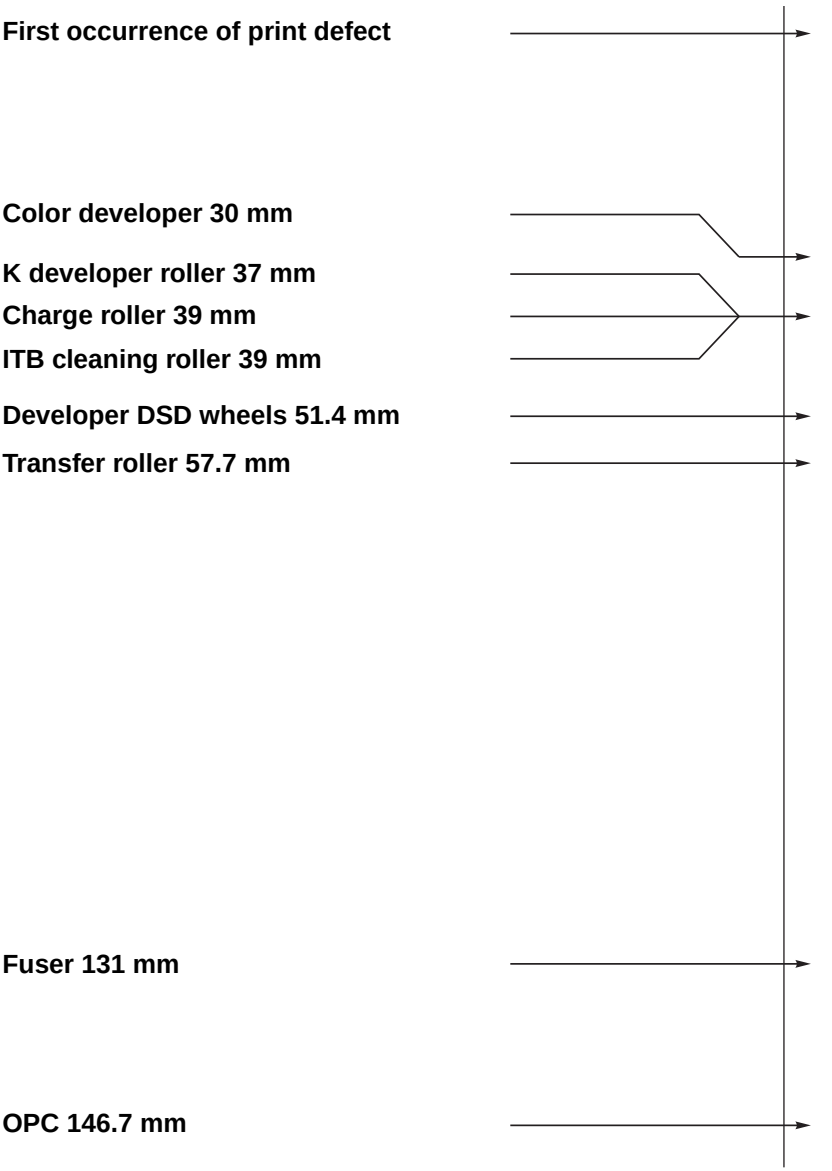

First occurrence of print defect
Color developer 30 mm
K developer roller 37 mm
Charge roller 39 mm
ITB cleaning roller 39 mm
Developer DSD wheels 51.4 mm
Transfer roller 57.7 mm
Fuser 131 mm
OPC 146.7 mm
Intermediate transfer belt 437 mm

Figure 7-6 **Repetitive defect ruler**

Table 7-3 Defect pitch chart

Consumable	Roller	Roller Diameter (mm)	Printed Pitch (mm)	Notes
Drum	Cleaning roller	12	38.8	K,M,C,Y processes 12mm between color planes
	OPC	46.7	151.1	K,M,C,Y processes 12mm between color planes
Developer	Black developer	16	36.9	K plane only
	C-M-Y developer	16	29.8	M, C, Y plane only
	RS-Roller	16	52	
	Dark to light bar 40 mm from top to solid fill area (typically black)			Developer ghost. Check developer life or for dirty Dmax sensor
Fuser	Upper	40	131	Aligned K, M, C, Y
	Lower	40	131	Aligned K, M, C, Y
ITB	T2 backing roller	27.5	88	Aligned K, M, C, Y
	Tension roller (near OPC)	18	56.5	Aligned K, M, C, Y
	T1 backing roller	14	45.3	
	Drive roller	27.5	86.4	Aligned K, M, C, Y
	ICL roller	12.3	38.6	Check if roller is clean. Check for proper cam/clutch operation.
T2 roller	T2 roller			Check that drive gear is installed and not damaged.
Engine	Registration roller	14.5	45.5	Aligned K, M, C, Y
Engine	Squaring roller	12	37.6	Aligned K, M, C, Y
	Face down upper exit roller	12.9	40.5	
	Face down lower exit roller	11.7	36.7	

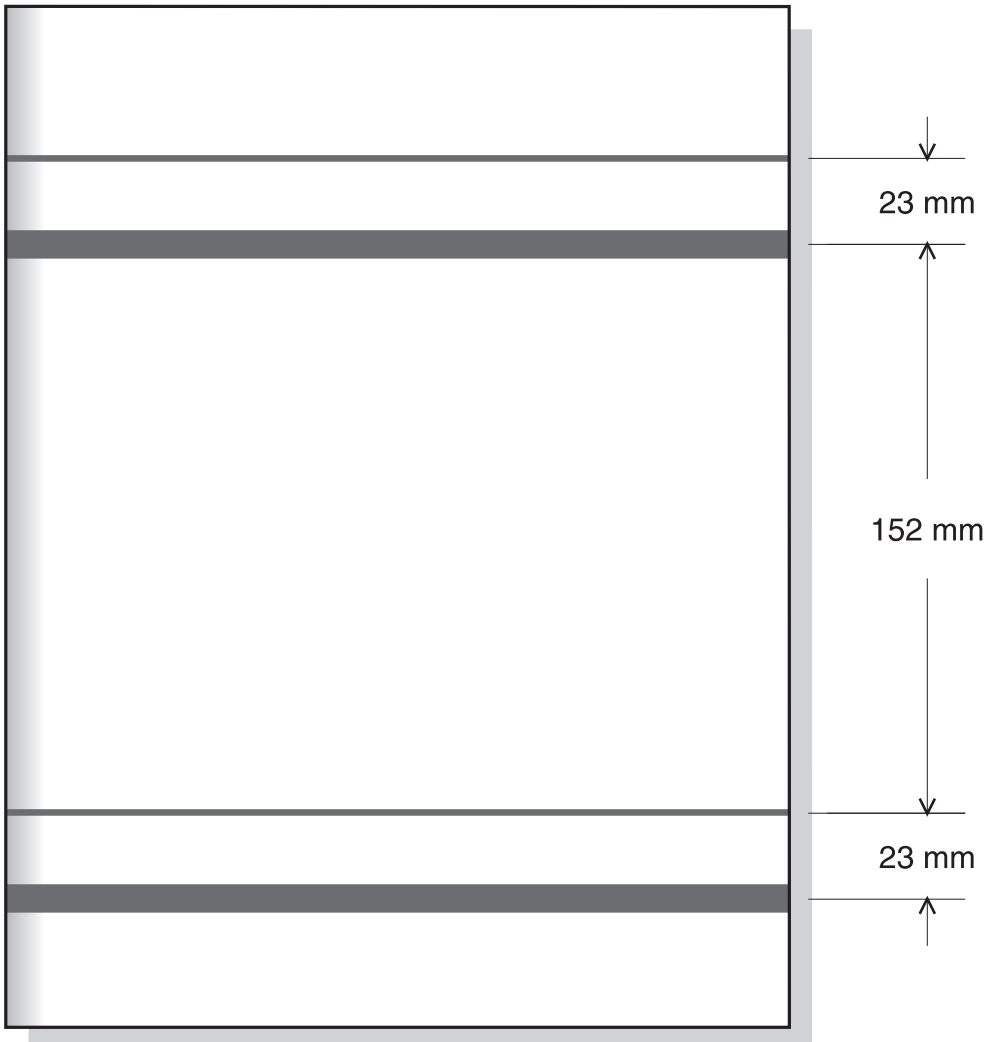


Figure 7-7 **Note 1, Defect pitch chart**

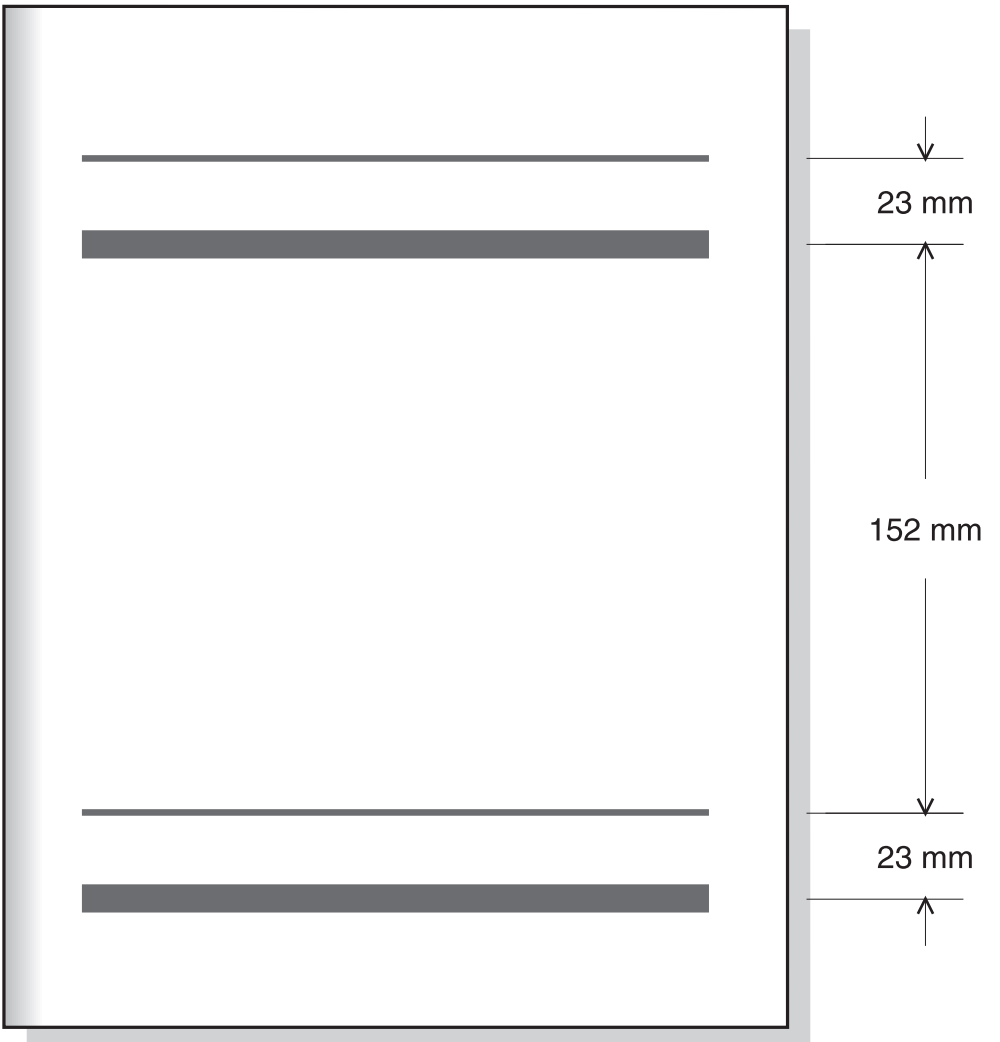


Figure 7-8 **Note 2, Defect pitch chart**

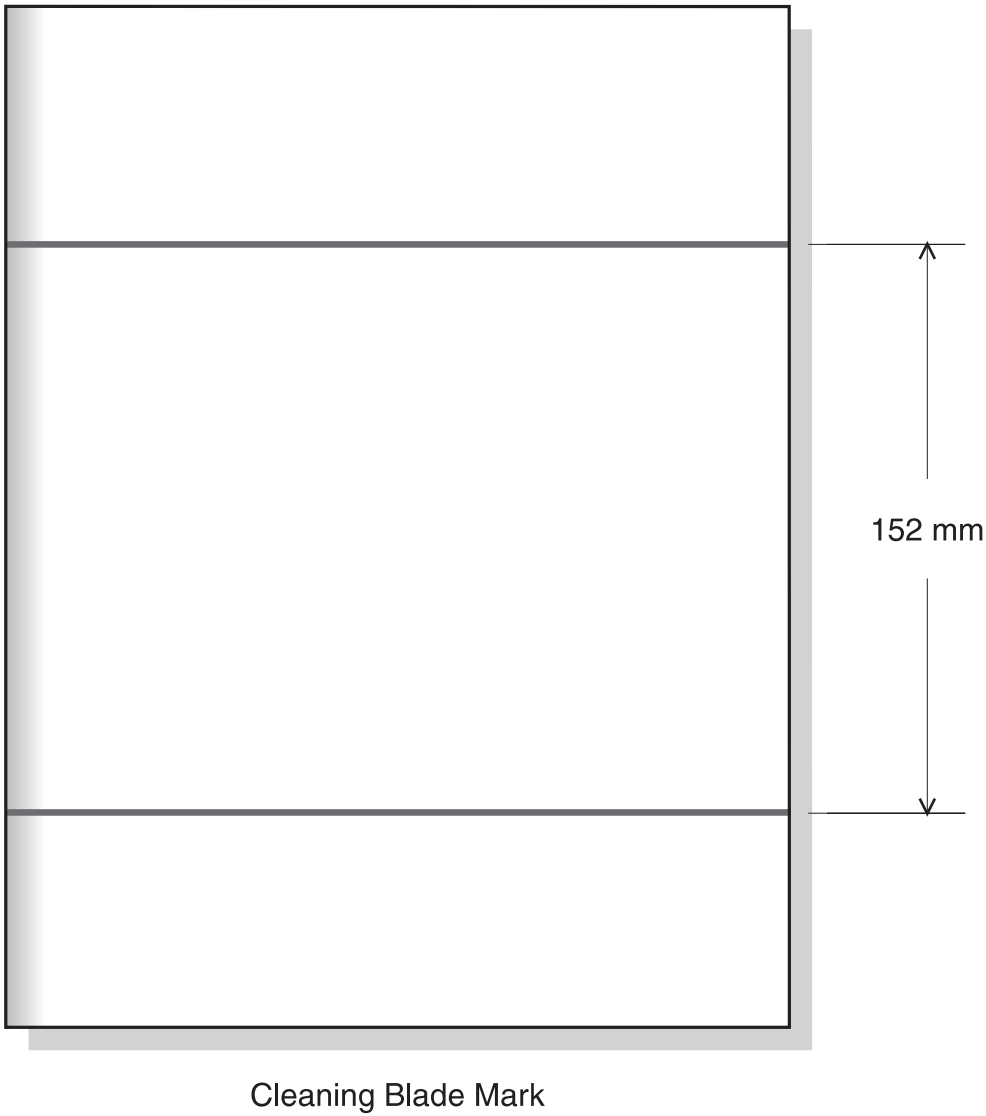


Figure 7-9 **Note 3, Defect pitch chart**

Interface troubleshooting

Communications checks

Note

Communication problems are normally the customer's responsibility. Time spent attempting to resolve these problems may not be covered by the product's Hewlett-Packard warranty.

Refer the customer to the network administrator for assistance in troubleshooting network problems.

If the printer is not connected to an MS-DOS-based host, proceed to Table 7-4, the Communications checks table.

Table 7-4 Communications checks

Checks	Action
Is your computer configured to the parameters described in the configuration instructions?	These parameters are required to communicate with the printer. Verify that the configuration of the computer's communications port matches these parameters. Note: If these parameters are not set properly, an error may display on the Control Panel.
For Serial Communications Only (refer to manufacturer's documentation)	
Does the printer's baud rate match that of the computer's communications port?	Print a Configuration Page to verify the baud rate setting. At the computer, verify that the baud rate is set correctly in any configuration files. Note: A baud rate problem may cause an error.
If using a bidirectional parallel cable, is it longer than 30 feet (10 meters) long?	The maximum recommended cable length for the printer is 30 feet (10 meters). Use a serial interface connection or move the printer closer to the host.
Do all the current Control Panel Configuration Menu items match the host system's parameters?	Make appropriate changes. If host system changes are made, be sure to reboot the system, or otherwise ensure the changes are in effect.
Does the printer have a bad interface port?	If possible, try a different printer interface than the one with the problem. Reconfigure the printer and host appropriately.
Does the host have a bad interface port?	If possible, try a different host system port. Reconfigure both the host and printer appropriately.

EIO troubleshooting

If the printer contains an optional HP JetDirect print server, and you cannot communicate with the printer over the network, verify the operation of the print server. Print an HP JetDirect configuration page. If the message “I/O CARD READY” does not appear on the configuration page, see the troubleshooting section of the *HP JetDirect Print Server Software Installation Guide*.

AUTOEXEC.BAT standard configurations

Parallel DOS commands

Ensure that the AUTOEXEC.BAT file contains the following statements for parallel interface communications:

```
MODE LPT1: , , P
```

For MS-DOS version 4.0 and above:

```
MODE LPT1: , , B
```

Note This example assumes that you are using parallel printer port LPT1. If you are using LPT2 or LPT3, replace LPT1 in the example with the appropriate printer port.

Serial DOS commands

Most IBM-compatible computers default to a parallel printer port. To ensure that information is sent to the serial printer port, type the following MS-DOS commands at the MS-DOS prompt, or include them in the AUTOEXEC.BAT file.

```
MODE COM1: 9600, N, 8, 1, P
MODE LPT1: =COM1
```

For MS-DOS version 4.0, or above, enter:

```
MODE COM1: 9600, N, 8, 1, B
MODE LPT1: =COM1
```

Note These examples assume that you are using serial printer port COM1. If you are using COM2 or COM3, replace COM1 with the appropriate printer port.

If the host system and printer still are not communicating replace the Formatter PCB and the EIO card and reconfigure the printer. If the problem persists, a protocol analyzer may be needed to find the source of the problem.

CAUTION HP LaserJet printers are not designed to work with mechanical switch-box products without proper surge protection. These devices generate high transient voltages that cause permanent damage to the Formatter PCB. This circumstance is not covered by the Hewlett-Packard warranty.

Printer Job Language (PJL) commands

See the *HP Printer Job language technical reference manual* for a complete description of PJL commands. This manual is available with the Technical reference package, part number 5010-3997.

@PJL [Enter]

This command enables the specified printer language. If the printer does not receive this command it enables the default language. This ensures that applications that do not support PJL print correctly. The command syntax is:

```
@PJL [Enter] LANGUAGE = {PCL/PostScript} [<CR>]
<LF>
```

UEL

This command (also referred to as the Universal exit language command) terminates the current printer language and returns control to PJL. It performs the following actions:

- Prints all data received before this command.
- Performs a reset: `<esc>E in PCL, <cntrl>D in PostScript`.
- Turns control over to PJL.

This command is also a valid HP-GL/2 terminator.

The UEL command must be immediately followed by the “@PJL” command prefix. Characters or control codes other than @PJL (such as <CR> or <LF>), enable the default language and process the print job in that language. All jobs must begin and end with the UEL command. Besides entering PJL, the UEL command has the same effect as the <esc>E command. However, the *<esc>E* command should always be included to ensure backward compatibility.

@PJL COMMENT

This command designates the current line as a comment, which is ignored. The syntax is:

```
@PJL COMMENT <words> [<CR>] <LF>
```

@PJL INFO CONFIG

This command solicits a response to describe the installed options. This command allows the printer to automatically configure the installed options as the applications require.

@PJL INFO ID

This command identifies the printer type to the host for reference when selecting printer drivers for automatic installation. The command syntax is:

```
@PJL INFO ID <CR> <LF>
```

@PJL INFO USTATUS

This command queries the state of unsolicited JOB status. PAGE and TIMED status are not supported. The syntax is:

```
@PJL INFO USTATUS <CR> <LF>
```

@PJL INFO PAGECOUNT

This command returns the number of pages printed by the engine.

@PJL JOB

This command informs the printer of the start of a PJL job and synchronizes the job status information. The printer counts print jobs, including nested jobs, incrementing the job counter for the @PJL JOB command and decrementing it for @PJL EOJ.

The printer accepts the NAME= parameter and returns the name string in the unsolicited JOB start status message (if unsolicited job status is enabled). The printer transmits the unsolicited JOB status message to every I/O channel which has enabled this function. This message's format is:

```
@PJL USTATUS JOB <CR><LF>
START<CR><LF>
[NAME=<job name><CR><LF>]
<FF>
```

The printer resets the nested job counter whenever it switches the source to a different I/O channel. This prevents a corrupt job on one channel from disrupting the activities on another channel.

@PJL EOJ

This command identifies the end of a print job and is a hint for the I/O switching algorithm. The printer counts nested jobs and recognizes job boundaries when the counter decrements to zero. The printer ignores isolated EOJ commands. Each EOJ must be preceded by a JOB command.

@PJL ECHO

This printer supports the ECHO command which transmits its parameters over the I/O channel to the host that issued the command.

@PJL USTATUS JOB=ON/OFF

This command enables or disables the JOB status for the I/O channel that delivers the command.

@PJL USTATUSOFF

This command disables the unsolicited JOB status for the I/O channel that delivered the command. For this printer, it duplicates the function of `@PJL USTATUS JOB=OFF, AND @PJL USTATUS DEVICE=OFF`.

Note All commands not supported by this printers PJL command set are returned with the message `@PJL XXXX<CR><LF>?<CR><LF>`.

Control panel

Control panel access

Accessing the diagnostics for control panel is a simple process. Hold down the left side of the [Item] key (<--) and power on the printer. Hold the key down until DIAGNOSTICS MODE is displayed on the front panel then release the key. The front panel will change and display FORMATTER DIAGS EXECUTE TESTS. Pressing the [Menu] key will switch between the Formatter diagnostics and the Engine diagnostics. Pressing the [Item] key will scroll through the diagnostics available in each section.

A menu map helps you use the control panel menus. See the menu map sample that follows.

Printing a menu map

Printing a menu map can help you navigate through control panel menus. See the menu map sample that follows

Printing a menu map

1. On the printer's control panel, press [Menu] until INFORMATION MENU displays.
2. Press [Item] until PRINT MENU MAP displays.
3. Press Select] to print the menu map. The printer will return to the READY state.

Interpreting the menu map

The following samples illustrate the printer's menu map and service menu map.

Figure 7-10 **Menu map**

1 Information menu

2 Paper handling menu

3 Configuration menu

4 Printing menu

5 I/O menu

6 Calibration menu

7 Resets menu

8 Resets menu

Figure 7-11 **Service menu map**

1 Service menu

2 Information menu

3 Paper handling menu

4 Configuration menu

5 Printing menu

6 I/O menu

7 Calibration menu

Information menu

The Information Menu selections are used for accessing and printing specific printer information.

Table 7-5 Information menu

Menu item	Description
PRINT MENU MAP	Prints the control panel menu map.
PRINT CONFIGURATION	Prints the printer configuration page.
PRINT CONFIG CONTINUOUS	Continuously prints the configuration page until [Cancel Job] is pressed.
PRINT FONT LIST	Prints the available PCL and PS (emulated PostScript) font samples.
PRINT LASERJET DEMO	Prints a demonstration page containing 5 images (A4/LTR).
PRINT LASERJET DEMO 2	Prints a duplexed (simplex if no duplexer present) demo page on the size shown in default size. (48 MB required for simplex, 64 MB for duplex)
PRINT ACCESSORIES	Prints a page giving the accessory and supplies part numbers (in English, French, German, and Spanish.
PRINT COLOR GUIDE	Prints a how to use color guide (A4/LTR).
SHOW EVENT LOG	Prints a historical list of printer events.
REMAINING LIFE	Displays the projected remaining life for the transfer belt, fuser, and imaging drum.

Paper handling menu

The Paper handling menu allows you to configure input trays by size and type. This menu can also be used to set the default media size and type.

Note The default mode for Tray 1 is TRAY 1 MODE=FIRST. In this mode, if media is loaded in Tray 1, and no other tray is requested, the printer will pull media from Tray 1 regardless of the size and type of media loaded in the tray. To configure Tray 1 by size or type, it must be configured as TRAY 1 MODE=CASSETTE.

Table 7-6 Paper handling menu

Menu item	Values
TRAY 1 MODE	FIRST* CASSETTE
TRAY 1 SIZE (appears only if Tray 1 mode is set to TRAY 1 MODE=CASSETTE)	LETTER*/A4** LEGAL EXEC JIS B5 A5 CUSTOM B5 COM10 C5 DL MONARC
TRAY 1 TYPE (appears only if Tray 1 mode is set to TRAY 1 MODE=CASSETTE)	PLAIN* PREPRINTD LTRHEAD TRNSPRNCY GLOSS PREPUNCHD LABELS BOND RECYCLED COLOR HEAVY CARDSTOCK
TRAY 2 TYPE	(same choices as TRAY 1 TYPE except LABELS and CARDSTOCK)
TRAY 3 TYPE	(same choices as TRAY 1 TYPE except LABELS and CARDSTOCK)
A4/LETTER OVERRIDE	NO* YES
DEFAULT SIZE	(same choices as TRAY 1 SIZE)

Configuration menu

The Configuration menu is used to set general printer default settings.

CAUTION Hewlett-Packard recommends that configuration settings only be changed by a system administrator. Configuration settings seldom need to be changed.

Table 7-7 Configuration settings

Menu item	Values	Description
POWERSAVE	OFF 1 MIN (used for troubleshooting) 30 MIN 1 HR* 2 HRS 4 HRS 8 HRS	The length of time before the printer goes into power-saving mode.
PERSONALITY	AUTO* PCL PS	The personality (language) the printer uses to process a print job.
CLEARABLE WARNINGS	JOB* ON	If ON, message is displayed until [Go] is pressed. If JOB, message is displayed until end of print job.
AUTO CONTINUE	ON* OFF	Determines whether the printer continues printing when certain errors occur. If ON, printer returns to the READY state. If OFF, printer remains offline until [Go] is pressed.
TONER LOW	CONTINUE* STOP	Determines whether the printer continues or stops printing when a TONER LOW condition is detected.
JAM RECOVERY	OFF* ON	Printer attempts to recover from jams and reprints affected pages.
PRINT PS ERRORS	OFF* ON	Prints out an error page when emulated PostScript errors occur.

Paper tray size functional test

Use the status/test feature of the service mode to check the function of the paper tray size switches. See the status/test address table in this chapter for information on this test. To test the paper tray switches:

Printer configuration page

Printing out a printer configuration page can help you verify that the printer is configured properly. This can be useful in troubleshooting printer problems.

To print a printer configuration page

1. On the printer control panel, press [Menu] until INFORMATION MENU displays.
2. Press [Item] until PRINT CONFIGURATION displays.
3. Press [Select] to print the configuration page. The printer will return to the READY state.

Note If the printer is configured with EIO cards (for example, an HP JetDirect Print Server), an additional configuration page will print that provides interface configuration information.

Interpreting the printer configuration page

The following sample illustrates a printer configuration page.

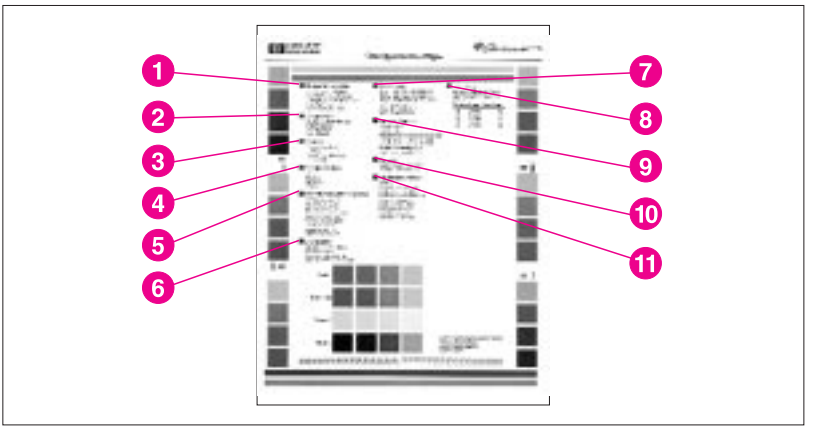


Figure 7-12 **Printer configuration page**

1 **Printer information**—Lists the printer serial number, PCL/PS firmware revision, total number of pages printed during the life of the printer, and total number of color pages printed during the life of the printer.

2 **Consumables: % of life remaining**—Lists the percentage of the estimated remaining life for the transfer kit, fuser kit, and the drum kit.

3 **Security**—Shows whether the printer control panel is locked or unlocked. Also shows whether the printer control panel password is enabled or disabled.

4 **Density settings**—Lists the current density settings.

5 **Configuration menu**—Lists the current settings of the configuration menu items.

6 **I/O menu**—Lists the current settings of the I/O menu items.

7 **Paper trays**—Lists the size and type of media currently configured for each input tray. Also lists the current Tray 1 mode, A4/letter override setting, and default size setting.

8 **Event log**—Lists the last five printer events, including printer jams, service errors, and other printer conditions. If printed while in service mode, all events (up to 50) are printed.

9 **Installed options**—Lists installed options such as EIO cards, DIMMs, duplex printing accessory, and 500-sheet paper feeder.

10 **Memory**—Shows the total memory installed and the total memory available in the printer. Also lists the memory allocation settings.

11 **Printing menu**—Lists the current settings of the printing menu items.

Event log

Detailed service information is noted in the event log. The following is a list of the types of messages logged in the event log:

- paper jam errors
- EIO errors
- catastrophic errors

The last 50 errors are listed with the most recent error listed first. The event log can be viewed either on the control panel display or it can be printed from the control panel.

To print the event log

1 Press [Menu] until `INFORMATION MENU` appears on the control panel display.

2 Press [Item] until `PRINT EVENT LOG` appears on the display.

3 Press [Select] to print the page. The printer will automatically bring itself online.

Service mode

Service mode allows for the modification of page counts and certain registration values for the printer. When the configuration page is printed while in service mode all event log messages will be printed as well. If both the formatter and DC controller are replaced at the same time, service mode will need to be utilized to execute the color plane registration sequence to ensure optimum print quality.

To access service mode

1 Hold down the [Cancel Job] key and [Select] key while powering on the printer until the display is blank and the 3 LEDs are on.

2 Press the right side of the [Menu +] key then the [Select] key.

Service mode will be displayed on the front panel briefly followed by 2 rows of asterisks. The printer will go through its normal start up cycle then display SERVICE MODE on the front panel. Below is a menu map showing what is available in service mode.

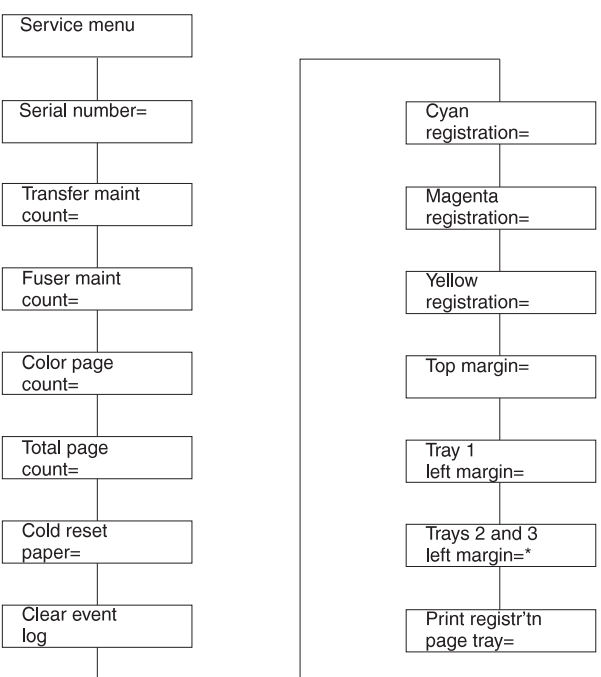


Figure 7-13 Service mode menu map

Serial number

The serial number displayed on the front panel should match the serial number tag located on the rear of the printer as this is the serial number printed on the configuration page.

Setting the serial number:

1. Press the [Item] key until SERIAL NUMBER = (number) is displayed.
2. Press the [Value +/–] key to change the character with cursor under it.
3. Press [Select] to save the character and move the cursor to the next slot.
4. Repeat steps 2 and 3 until all the characters match the label on the back of the printer.

Transfer maintenance count

There are two methods to track the life of the intermediate transfer belt (ITB). The life lever on the ITB is the method used to actually indicate when the ITB has reached its end of life. The Transfer maintenance count is used to show the percent of life on the configuration page. Although this number is not critical to printer operation, it does provide a way for customers to monitor consumable life. The transfer maintenance count is set to zero when the life message for the ITB is reset. Only when the ITB is replaced before the end of life message is displayed does this value need to be set to 0.

Setting transfer maintenance count:

1. Press the [Item] key until transfer maintenance count is displayed.
2. Press the [Value +/–] key to set the number.
3. Press [Select] to save.
4. Repeat steps 2 and 3 to change the other numbers if required.

Fuser maintenance count

The fuser maintenance count functions the same way as other HP LaserJets. This count is the actual life of the fusing unit and is used to indicate its end of life. If the fuser is replaced before the end of life message is displayed the fuser count must be reset to zero. An actual end of life condition will have a reset to clear the end of life message and set the fuser count to zero.

Setting fuser maintenance count:

1. Press the [Item] key until FUSER MAINTENANCE COUNT is displayed.
2. Press the [Value +/–] key to set the number.
3. Press [Select] to save.
4. Repeat steps 2 and 3 to change the other numbers if required.

Color page count

Color page count is simply used to track the number of pages with any color on it other than black. Although this count is not critical, there may be customers who use it to track the number of color documents printed. If the number needs to be reentered, select a number which is as close as possible to the original. An earlier configuration page is a great source if one can be found.

Setting color page count:

1. Press the [Item] key until COLOR PAGE COUNT is displayed.
2. Press the [Value +/–] key to set the number.
3. Press [Select] to save.
4. Repeat steps 2 and 3 to change the other numbers if required.

Total page count

Total page count tracks the total number of pages printed. As with the color page count, the number is not critical but can be useful for customers.

Setting total page count:

1. Press the [Item] key until TOTAL PAGE COUNT is displayed.
2. Press the [Value +/–] key to set the number.
3. Press [Select] to save.
4. Repeat steps 2 and 3 to change the other numbers if required.

Clear event log

Clear event log (Event log empty) does exactly what it says. There may be time when it is necessary to clear the event log to allow the tracking of an issue. To clear the event log simple press the [Select[key. Once the event log is cleared it will read event log empty.

The next items in the list deal with color plane registration along with top and left margin settings for the different trays. Please refer to the registration page section for an explanation of these settings and how to set them.

Registration page

Note The setting of the registration values must be done if both the formatter and DC controller are replaced at the same time. If only one is replaced the registration values are copied from the other.

Printing a registration page

1. Scroll through the Service menu until print registration page is displayed.
2. Select which paper tray to pull paper from (only when setting left side margins will the tray actually matter).
3. Press [Select] to print the registration page.

In the center of the page are horizontal (Scan) and vertical (Process) sets of bars for cyan, magenta, and yellow. Each bar is made up of a series of lines with black being used as the base for setting the correct registration values for the 3 other colors. Along the top and left side of the page are lines with numbers which are used for top and left side margins. The tray from which paper was pulled is listed on the bottom of the page.

Setting registration numbers

On each of the color bars in the process section are bolded numbers which indicate the current number set on the control panel. These bolded numbers will always be in the middle of the bars. To set the correct value for each of the colors, look at the lines within the bar and find the grouping which has the color line directly on top of the black line (it will have more white space). Print at least 5 registration pages to see if the new settings are correct.

Hint Using a magnifying glass to look at the lines will help in selecting the best number.

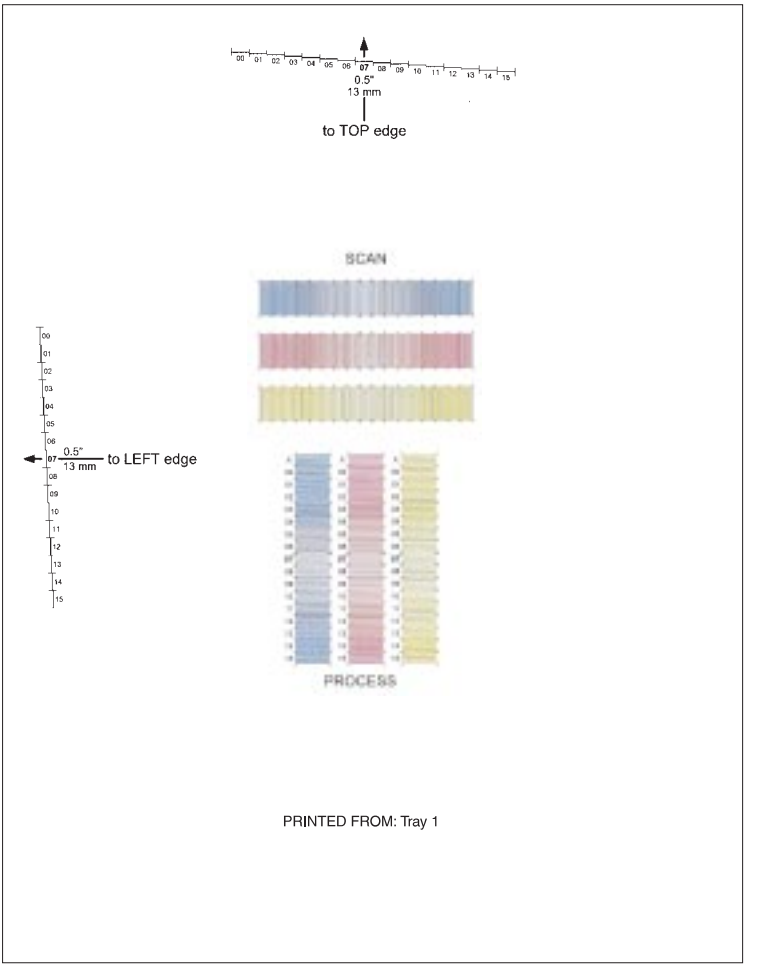


Figure 7-14 **Registration page**

Note

Hewlett-Packard strongly recommends that the registration values be selected on the basis of averaging five consecutive samples.

Setting the registration number:

1. Use the [Item] key to select the appropriate color (Cyan, Magenta, or Yellow) at its registration number.
2. Press the [Value +/–] key to change the registration number to the one identified.
3. Press the [Select] key to enter the value.

Setting margin numbers

The top margin number is not tray dependent like the left side margin. Simply print the registration page from whichever tray has paper. Using a ruler, measure from the top edge of the paper to the series of lines. Find the line which is 13 mm (0.5 in) away from the paper's edge.

Setting the top margin registration value:

1. Press the [Item] key to scroll through the service menu until top margin is displayed.
2. Press the [Menu +/–] key until the number to be entered is displayed.
3. Press the [Select] key to enter the number.

Print another registration page and the number just entered will align with the arrow and be bolded.

The left side margin setting is tray dependent. Tray 1 has its own number while trays 2 and 3 are combined. The procedure is the same as the top margin with one exception. The page must be printed from the tray which will be adjusted.

Printing from Tray 1:

1. Press the [Item] key until `PINT REGISTRiTN PAGE TRAY =1` (default) is displayed.
2. Press the [Select] key.
3. Measure from the left side of the paper to the lines and find the line which is 13mm (0.5 in) from the edge.

If the number for the line is different then the current number:

1. Press the [Item] key until `TRAY 1 LEFT MARGIN = *` is displayed.
2. Press the [Value] key to change the number to the number required.
3. Press the [Select] key

Printing from tray 2 and 3:

1. Press the [Item] key until `PINT REGISTRiTN PAGE TRAY = 2 or 3` is displayed.
2. Press the [Select] key.
3. Measure from the left side of the paper to the lines and find the line which is 13mm (0.5 in) from the edge.

If the number for the line is different then the current number:

1. Press the [Item] key until `TRAY 2 AND 3 LEFT MARGIN = *` is displayed.
2. Press the [Value] key to change the number to the number required.
3. Press the [Select] key.

Diagnostics mode

This section provides an overview of the diagnostic tools incorporated into the HP Color LaserJet 4500/4500 N/4500 DN printer.

CAUTION When performing printer diagnostics, caution must be taken to avoid risk of injury. Only trained service personnel should access the diagnostic mode with the skins removed.

There are two diagnostic sections built into the firmware, one for the formatter and the other for the engine. Each section contains different tests which allow the service technician to verify printer functionality. While in diagnostic mode there are no error messages associated with these tests. Therefore, determination of the problem will rely on the technicians skill. To exit diagnostic mode, simply power off the printer.

Engine diagnostics

Engine diagnostics accesses portions of the printers internal diagnostics which occur when the printer is powered on. These diagnostics are available as a tool to help isolate problems which are not reported by the firmware. As mentioned previously, no error message will be displayed if there is a problem in the section being tested. A good understanding of how the printer operates is required to use the engine diagnostics successfully.

To have a better view of the areas being exercised, remove the left side cover and the lower front drawer (ITB drawer). Defeat the two ITB drawer switches located on the left-side of the drawer cavity. Now you can run the diagnostics and watch the assemblies as they are operated.

Listed below in (Table 7-8) are the diagnostics available and a brief description of what the diagnostic will do. A detailed explanation for each diagnostic can be found under its own heading later in this document.

Table 7-8 Engine diagnostics

Menu Item	Selectable Value	Description
Continuous	N (default) Y	Selected test will run once Selected test will run in a continuous loop
Paper path test		Turns on the motors which control the paper path section of the printer.
Developer test		Rotates the carousel and the developers.
Drum test		Turns on the drum drive motor which drives the drum and ITB.
Path sensors		Displays the state for each of the paper path sensors and switches.
Door sensors		Displays the state for each of the door and drawer switches.

To access diagnostics mode

1 Hold down the [<-- Item] key and power on the printer.

Paper path test

1 Press the [Item] key until you see `ENGINE DIAGS PAPER PATH TEST`.

2 Press the [Select] key to activate the test. While the test is running you will see `ENGINE DIAGS E1:PAPERPATH` displayed in the front panel.

The test takes approximately 15 seconds to run.

Components exercised by the paper path test include the Fusing motor (M1), paper path motor (M2), and associated gears and assemblies. The paper pick roller for tray 2 can be activated by manually activating the paper pick solenoid (SL2). This test will not pick paper and move it through the paper path. To test this function, simply run a configuration page. For multiple pages, select continuous configuration page in the control panel.

The paper path test allows the service technician to verify the operation of components within the paper path. When the test is initiated both the M1 and M2 are activated. You will see the ITB lift cams rotate once and the ITB drive gear turn briefly. The remaining portion of the test simply allows both the M1and M2 to run, thus exercising the gears and rollers associated with them.

Note If an error occurs during the paper path test, the message `PATH_1PAPER PATH TEST FAILED` is displayed.

Developer test

The developer test rotates the carousel stopping at each toner cartridge and rotating the developer sleeve. For the best view of the carousel and the toner cartridge sleeves, remove the drum cartridge. The Top Front Drawer (Drum drawer) must be closed before the test can run.

1. Press the [Item] key until `ENGINE DIAGS DEVELOPER TEST` is displayed.
2. Press the [Select] key to run the test. The front panel will display `ENGINE DIAGS E2:DEVELOPER` while the test is running. Watch the carousel and make sure toner cartridge developer sleeve rotates. The sequence will be black followed by a pause, then magenta, cyan, and finally yellow.

The test will last for approximately 35 seconds. While the Develop test is running you will see the drum turn if it is installed, as well as the drive gear for the ITB.

Drum test

The Drum test exercises the drum drive mechanism. Also, the fuser motor is turned on to allow the lift cams for the ITB to be rotated into the ITB up position.

1. Press the [Item] key until `ENGINE DIAGS DRUM TEST` is displayed.
2. Press the [Select] key to run the test. The front panel will display `ENGINE DIAGS E3:DRUM` while the test is running.

Watch to see if the ITB lift cams turn and if both the drum drive gear and the ITB drive gear is rotating

Path sensors

The Path sensors test allows the paper path sensors and switches to be tested for correct operation. Table 7-9 shows the correlation between the identifier on the front panel and the sensor or switch it represents.

Table 7-9 Paper path sensors and switches

Identifier	Name	Description
A	PS8	Tray 2 paper detect sensor
B	PS3	Tray 1 last piece of media pulled sensor
C	PS4	Tray 1 paper detect sensor
D	SW801	Tray 2 paper size switch 2
E	SW802	Tray 2 paper size switch 1
F	SW803	Tray 2 paper size switch 0
G	PS3001	Optional Tray 3 paper detect sensor
H	SW3001	Optional Tray 3 paper size switch 2
I	SW3002	Optional Tray 3 paper size switch 1
J	SW3003	Optional Tray 3 paper size switch 0
K	PS10	Carousel position sensor
L	PS11	N/A
M	N/A	500-sheet feeder: 1=installed, 0=uninstalled
N	PS9	Top output tray full sensor

1 Press the [Item] key until `ENGINE DIAGS PATH SENSORS` is displayed on the front panel.

2 Press the [Select] key to activate the test. The front panel will display A through N with a binary value below it.

When running this test, make sure the ITB drawer is installed with Tray 2 and Tray 3 (if installed) removed. In this state the default value on the front panel should be: 0X111111110010, where the x can be either a 0 or 1. If there is any other value then there is a possible problem. Identify the sensor or switch in the table above and test to see if the value changes. Cassette paper size settings for each tray are described in Table 7-10.

Table 7-10 Paper size settings

Paper Size	Tray 2 Switches (DEF)	Tray 3 Switches (HIJ)
A4	000	000
B5	001	001
Custom (A5)	010	011*
Custom (B5 ISO)	011	011*
Letter	100	100
Executive	101	101
Legal	110	110
No tray installed	111	111

* These values are the same for tray 3.

Door sensor test

The door sensor test allows service personnel to open and close doors on the printer while watching the sensor status on the front panel. Switches 4 and 5 are in series with each other which causes the value to toggle under identifier A.

Once the door sensor test is initiated, the front panel displays the status for each sensor listed in the Table 7-11 below. As a door is opened and closed the state of the sensor changes the indicator values on the front panel.

Table 7-11 Sensor status

Identifier	Name	Description
A	SW4 and SW5	Front and rear door switches
B	SW1 *	ITB drawer switch
C	SW2 *	Toner cartridge door *
D	SW3 *	Drum drawer switch *
E	Drum detect	Detect if a drum cartridge is installed
F	Fuser	Detects if fuser is installed. Changes state if not detected or removed when rear door is opened and closed.

* Activates (A) as well when opened.

1 Press the [Item] key until `ENGINE DIAGS DOOR SENSORS` is displayed on the front panel.

2 Press the [Select] key to activate the test.

The front panel will display A through F with a binary value below it. All the doors and drawers should be closed. In this state the display will show all 0's. Open the doors and drawers one at a time to verify correct functionality. If operating correctly the 0 will change to a 1. If a 1 is displayed with all doors and drawers closed there is a bad switch or connection.

Formatter diagnostics

Formatter diagnostics are designed to be used by qualified service personnel. This set of tests are designed to thoroughly test the functionality of the formatter. If all the tests pass the formatter is working correctly and a high confidence can be assumed that the problem resides elsewhere. Listed below are descriptions of the formatter tests available.

Table 7-12 Formatter diagnostics

Test	Description
REPEAT	If set to yes, the tests will run continuously until interrupted.
ON FAULT	The following will occur for each setting: BREAK - the test will stop when a failure occurs. PAUSE - stops the test for a short period of time then resume with the remaining tests. CONT - will continue to execute the tests even when a failure occurs.
ROM CRC	Test the firmware ROM for correct functionality.
DRAM	Tests the on-board RAM and the DIMMs.
SRAM 1	Tests the SRAM inside the ASIC.
SRAM 2	Tests the SRAM physically mounted on the formatter.
NVRAM	Tests the formatter NVRAM. This test takes 15 minutes to run and should only be used when NVRAM values are being lost. In almost all cases, this test should never be run.
EXECUTE TESTS	Runs the selected tests.

Engine test

The printer has one test pattern (vertical lines). When an image defect appears, a test print can be made to identify the problem. The test print can be made by pressing the test print switch located on the left side of the printer (Figure 7-15). A test pattern can be printed by pressing the test print switch once after the photosensitive drum has stopped and the printer has entered the standby mode. If the switch is held down, the test pattern is printed continuously. The switch can be used when paper is loaded in any tray other than Tray 1.

The Engine test does the following:

- Verifies that the print engine is functioning correctly (the Formatter PCB is completely bypassed during an engine test).
- Is used for isolating printer problems.
- Is used for checking and adjusting registration.
- Prints from Tray 2 or 3 only, not from Tray 1.
- Can be activated with the Formatter PCB removed.

Note For the printer to perform an engine test, Tray 2, 3 must be installed and loaded with paper, and the Toner cartridge must be installed in the printer.

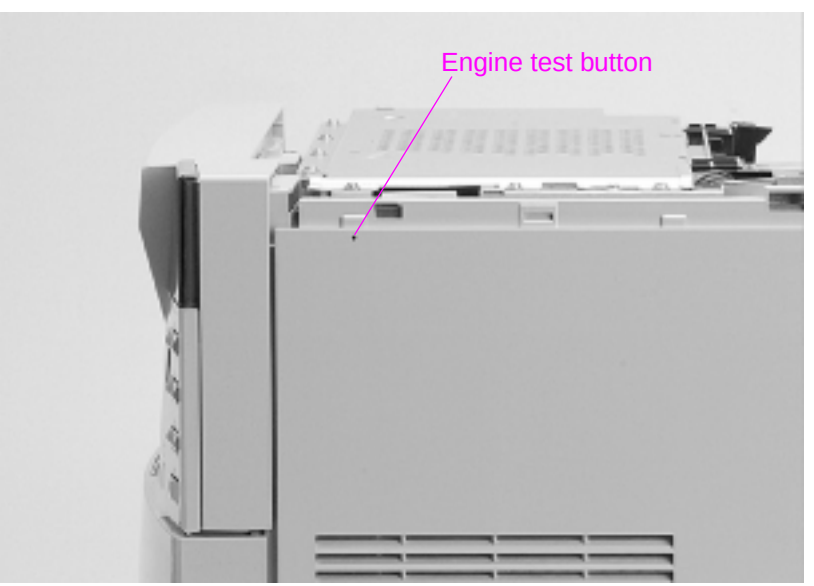


Figure 7-15 **Location of the engine test button**

Diagrams

Sensor locations

Sensors, monitored by the DC controller, detect the presence of paper, paper motion, paper jams, and the developer select clutch position. Table 7-13 provides functions and locations of the printer sensors.

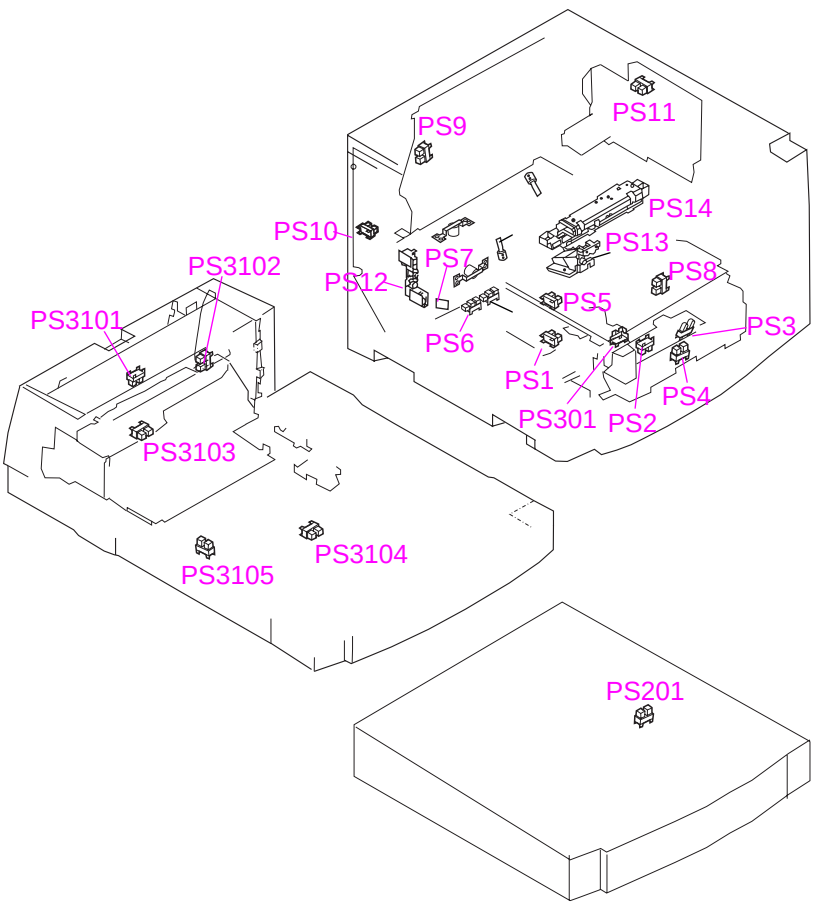


Figure 7-16 **Sensors locations**

Table 7-13 Sensor function and locations

Name	Function
PS1	ITB unit life sensor

Table 7-13 Sensor function and locations (continued)

Name	Function
PS2	Registration paper sensor
PS3	Last paper sensor
PS4	Multi-purpose tray paper sensor
PS5	ITB home position sensor
PS6	Fusing unit pressure release sensor
PS7	Delivery paper sensor
PS8	Cassette paper sensor
PS9	Face-down tray paper full sensor
PS10	Carousel home position sensor
PS11	Toner cartridge press sensor
PS12	Toner level sensor
PS13	Waste toner sensor
PS14	Density sensor
PS101	Duplex pick-up paper sensor
PS102	Side registration sensor
PS103	Reversed unit paper sensor
PS104	Face-up sensor
PS105	Reversed unit stationary paper sensor
PS201	Paper feeder paper sensor
PS301	OHT sensor (Multi-purpose tray PCB).
PS3001	Paper feed detection sensor.
PS3101	Reversing unit paper sensor
PS3102	Face-up sensor
PS3103	Reversing unit stationary paper sensor.
PS3104	Duplex pick-up paper sensor.
PS3105	Side registration home position sensor.

Printer solenoids locations

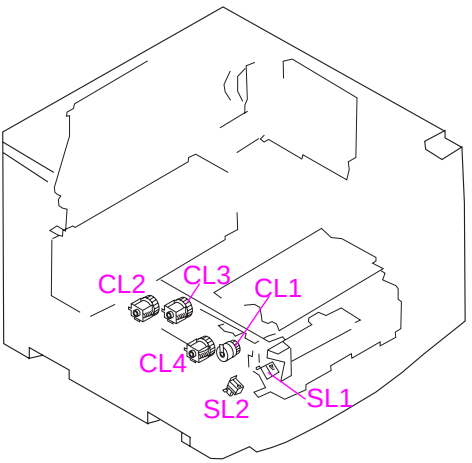


Figure 7-17 **Printer Solenoids**

Solenoids and clutches

Table 7-14 Solenoid and clutch functions and locations

Name	Function
SL1	Multi-purpose tray pick-up solenoid
SL2	Paper pick-up solenoid
CL1	Registration clutch
CL2	ITB unit separation clutch
CL3	ITB cleaning roller separation clutch
CL4	Secondary transfer roller separation clutch

Printer motors/fans

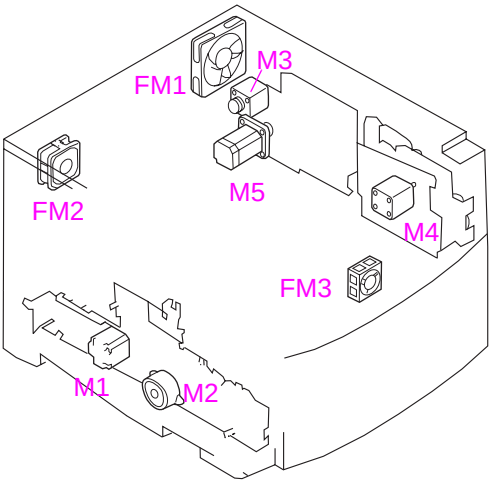


Figure 7-18 **Printer motors and fans**

Table 7-15 Printer motors and fans

Name	Code	Description
Motors	M1	Fusing motor
	M2	Pick-up motor
	M3	Carousel motor (Carousel drive unit)
	M4	Drum motor (Drum drive unit)
	M5	Toner cartridge motor
Fan Motors	FM1	Large fan
	FM2	Small fan
	FM3	Fan (Upper front cover fan)

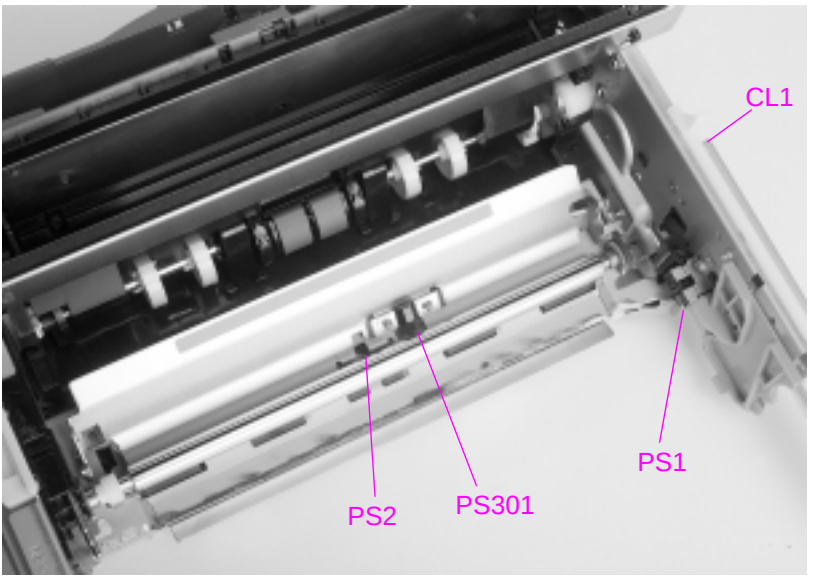


Figure 7-19 **Miscellaneous sensors and clutches**

Table 7-16 Miscellaneous sensors and clutches

Name	Description
PS2	Registration sensor
PS301	Overhead transparency sensor
PS1	Intermediate transfer belt life sensor
CL1	Registration clutch (on outside drawer wall)

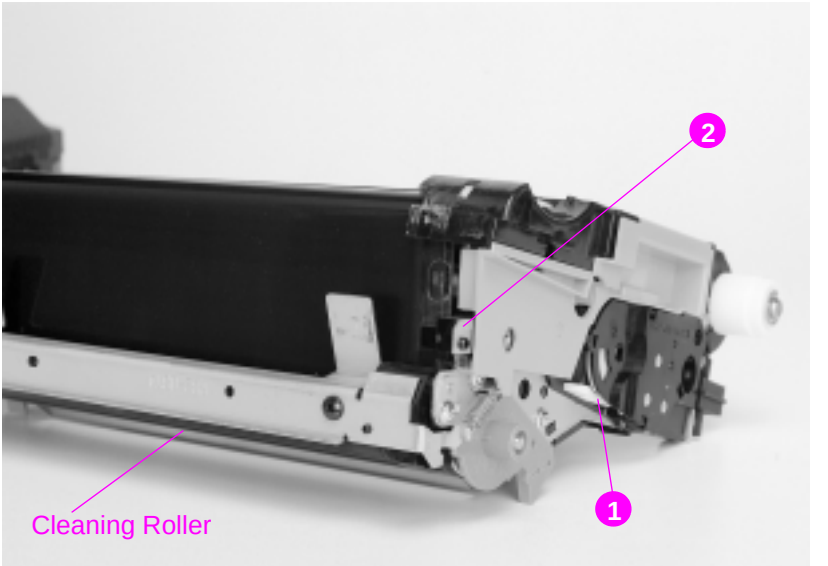


Figure 7-20 **Intermediate transfer belt sensors**

Table 7-17 Intermediate transfer belt sensors

Name	Description
1	Intermediate transfer belt (end of life lever)
2	Intermediate transfer belt (home position sensor) (PS5)

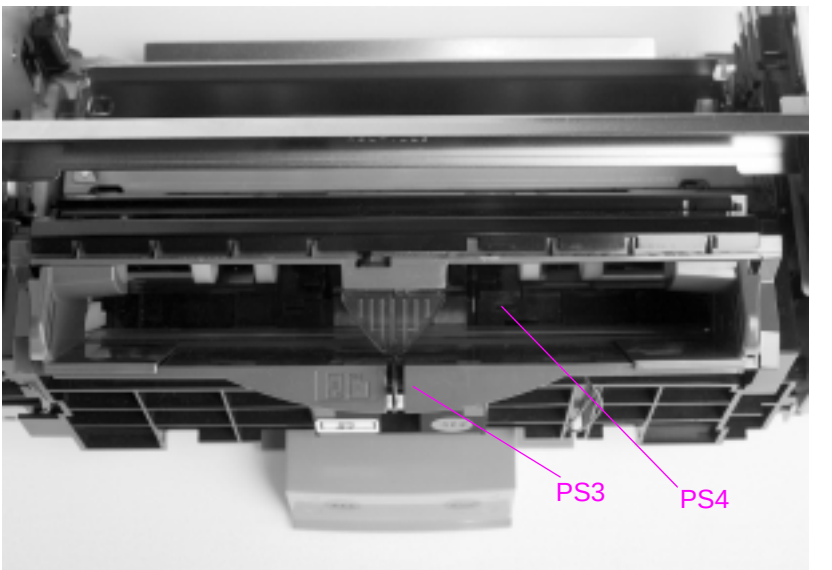


Figure 7-21 **Miscellaneous sensors (with Tray 1 front cover removed)**

Table 7-18 PS3 and PS4 description

Name	Description
PS3	Tray 1 last page sensor
PS4	Tray 1 paper sensor

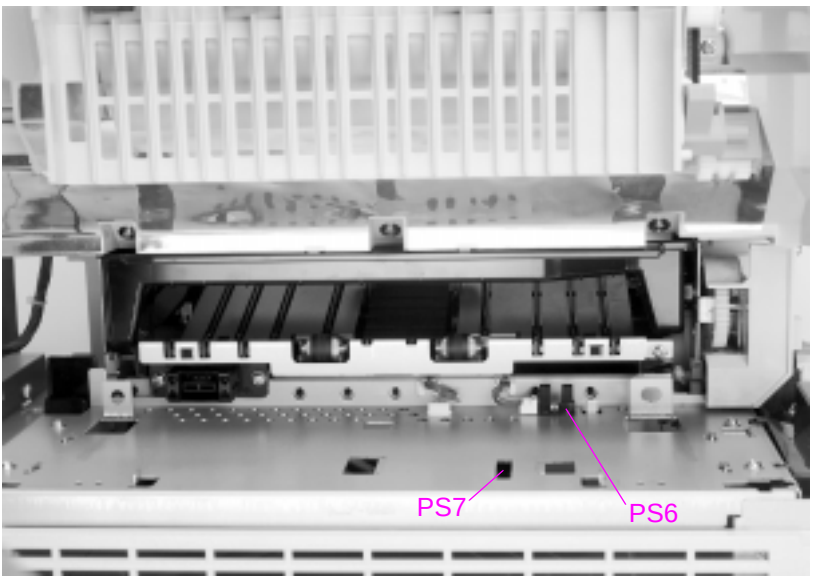


Figure 7-22 **PS6 and PS7 sensor location**

Table 7-19 PS6 and PS7 description

Name	Description
PS6	Fusing assembly pressure sensor
PS7	Paper exit sensor (access through the opening)

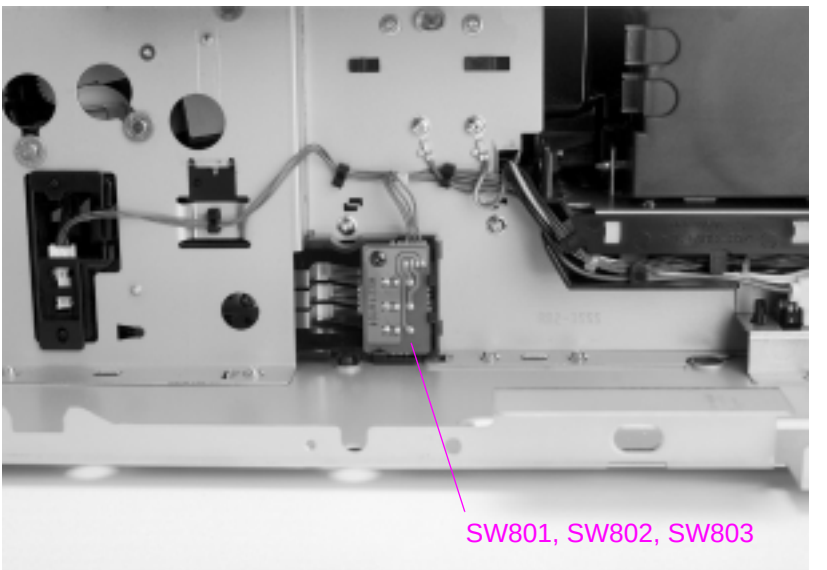


Figure 7-23 **Miscellaneous switches**

Table 7-20 Switch description

Name	Description
SW801, SW802, SW803	Paper tray size switches (power supply and high voltage power supplies removed)

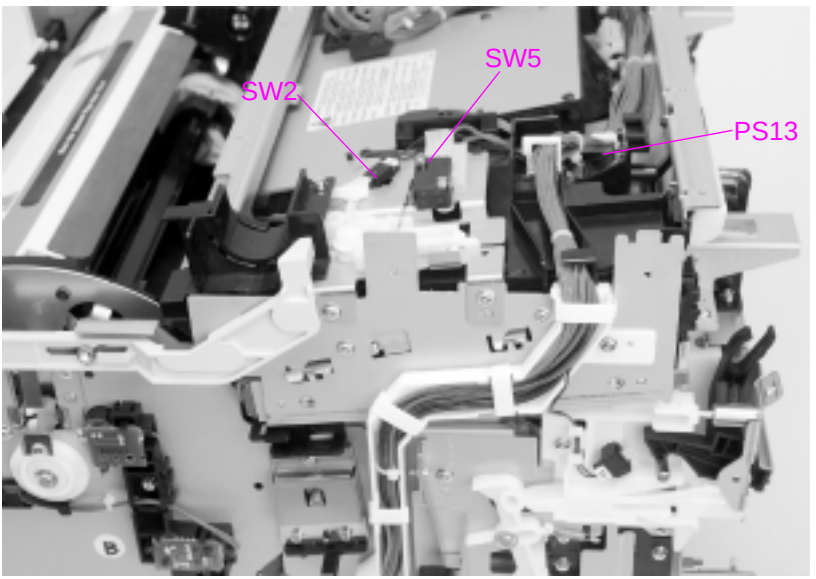


Figure 7-24 **Miscellaneous switches and sensors**

Table 7-21 SW2, SW5, and PS13 description

Name	Description
SW2	Top cover (toner door) switch
SW5	Top cover/rear door +24V interrupt switch
PS13	Waste toner full sensor

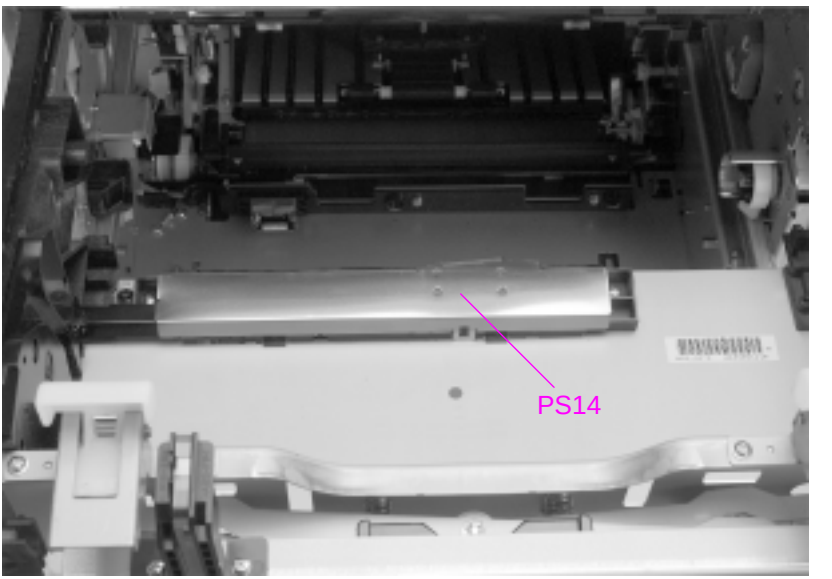


Figure 7-25 **PS14 sensor location**

Table 7-22 Density Sensor Location

Name	Description
PS14	Density sensor

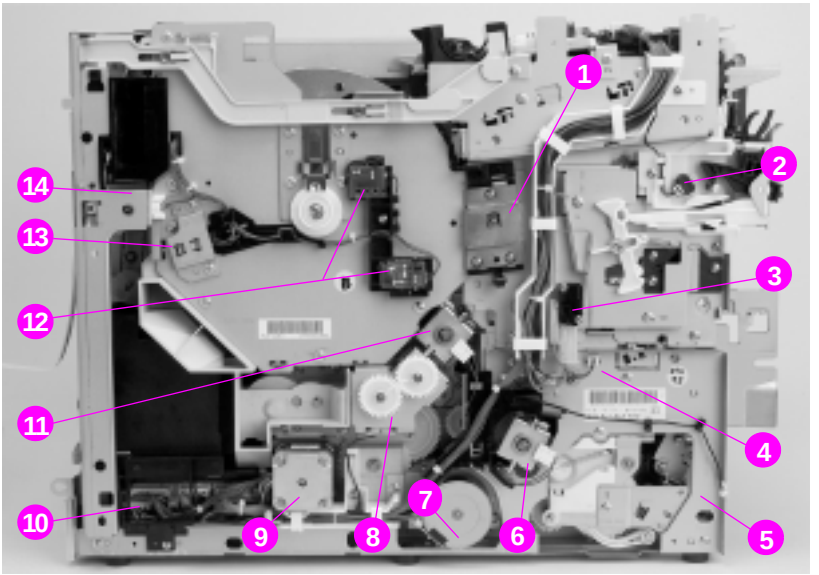


Figure 7-26 **Miscellaneous parts**

Table 7-23 Miscellaneous parts

Location	Name
1	Drum ground connector
2	Drum drawer closed switch (SW3)
3	Front drawers drum/ITB +24V interrupt switch (SW4)
4	ITB drawer closed switch (inside chassis wall) (SW1)
5	Tray 2 pickup solenoid (behind chassis wall)
6	Secondary transfer roller lift cam clutch (CL4)
7	Pickup motor (M2)
8	ITB cam clutch (behind lower gear) (CL2)
9	Fusing motor (F1)
10	Feed PCB
11	Cleaning roller cam clutch (CL3)
12	Toner level sensor (emitter receiver) (PS12)
13	Carousel “home position” sensor (PS10)
14	Rear left (small) cooling fan connector

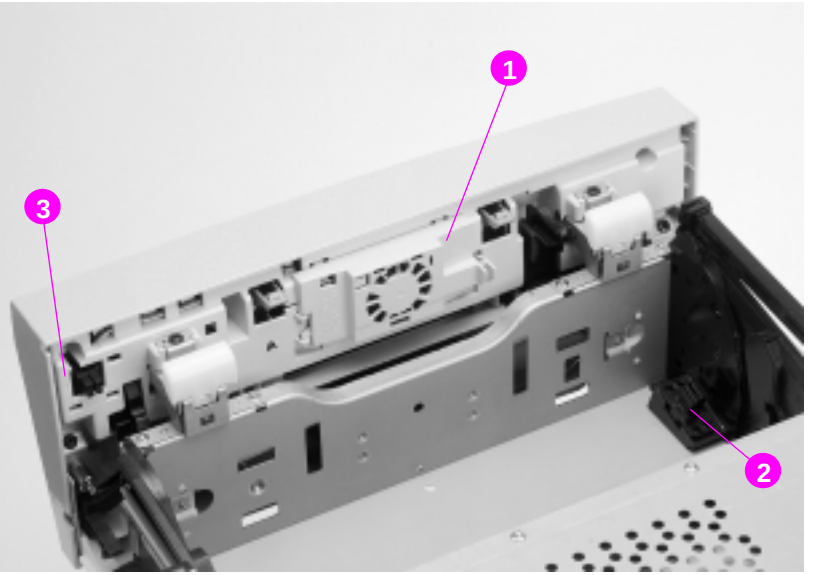


Figure 7-27 **Fan 3/eeprom connector and chassis connector**

Table 7-24 Fan 3/eeprom connector and chassis connector

Location	Name
1	Fan (FM3)
2	Imaging drum eeprom connector
3	Imaging drum drawer/chassis connector

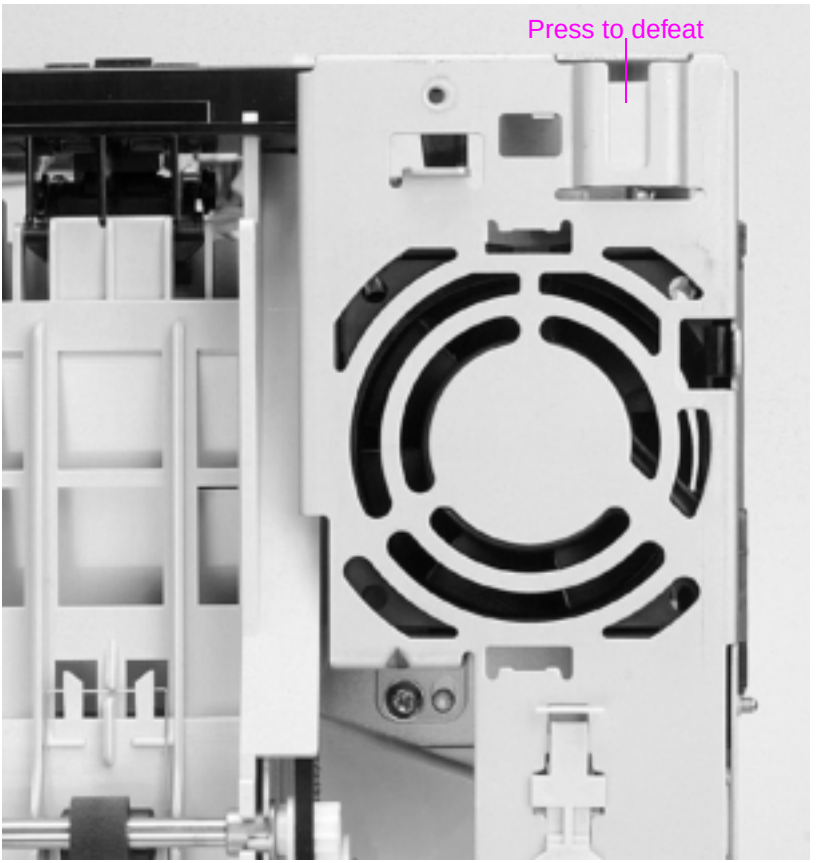


Figure 7-28 **Rear door interlock switch defeat**

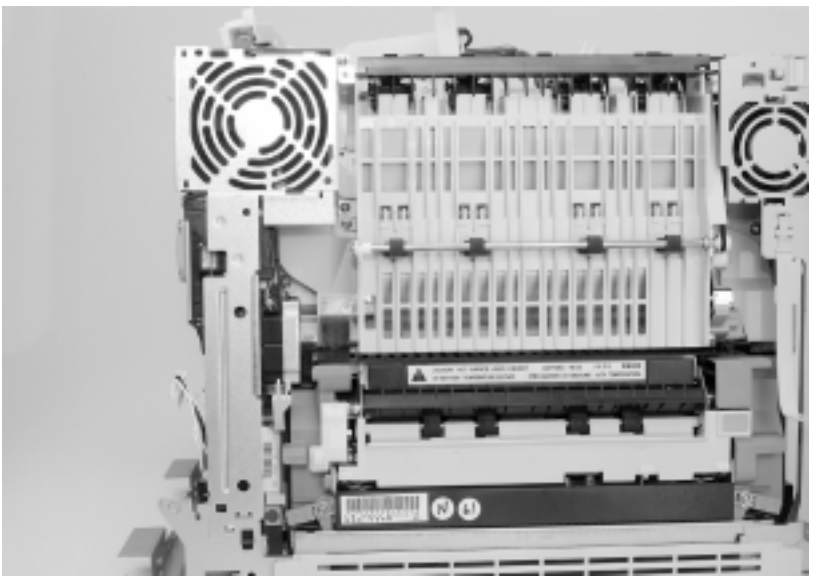


Figure 7-29 **Right rear fan**

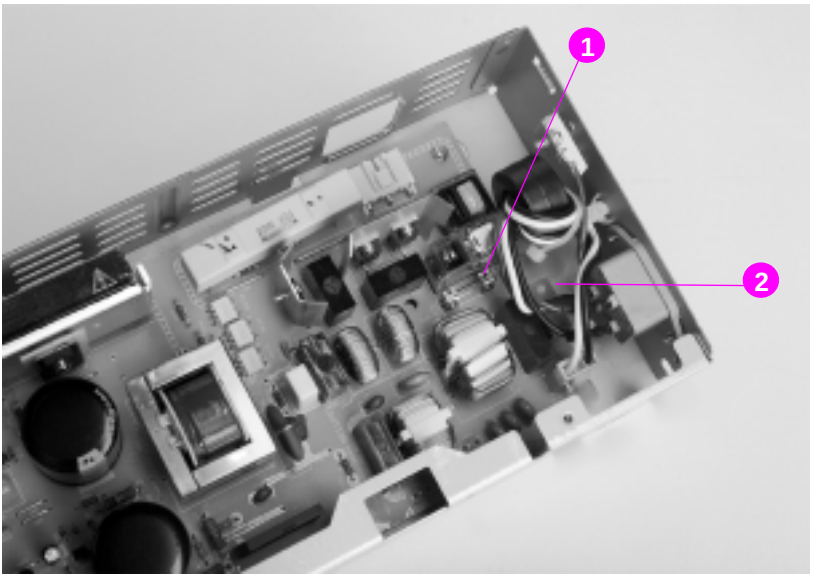


Figure 7-30 **Fuse (F1) and CB101**

Table 7-25 Fuse F1 and CB101 location

Location	Description
1	Fuse F1
2	Circuit breaker CB101

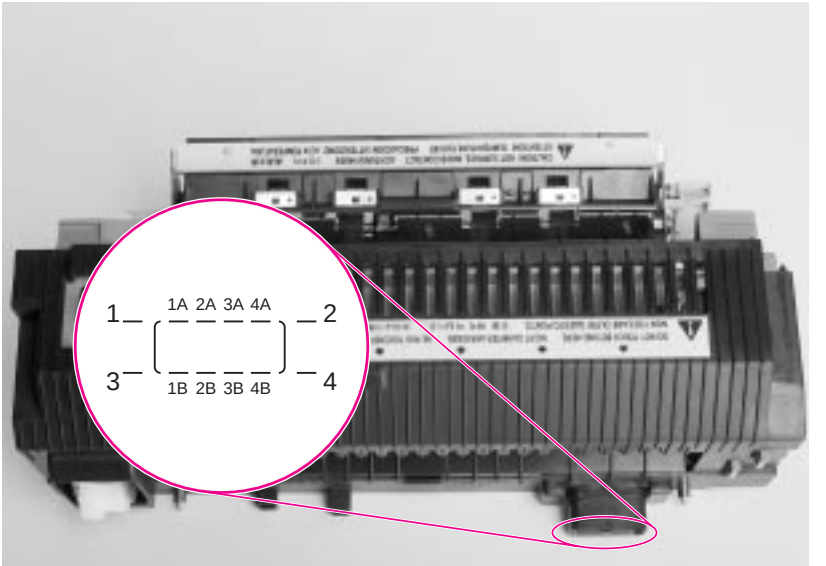


Figure 7-31 **Fusing assembly**

Table 7-26 110 volt fusing assembly

Location	Description
Pin 1	Frame ground
Pins 2 to 4	6.3 ohms ± 1 ohm
Pins 3 to 2	3.1 ohms ± 1 ohm
Pins 4 to 3	3.1 ohms ± 1 ohm
1A to 2A	310 K to 430 K ohm at (room temperature)
1B to 2B	310 K to 430 K ohm at (room temperature)
3B to 4B	short 110 volt unit

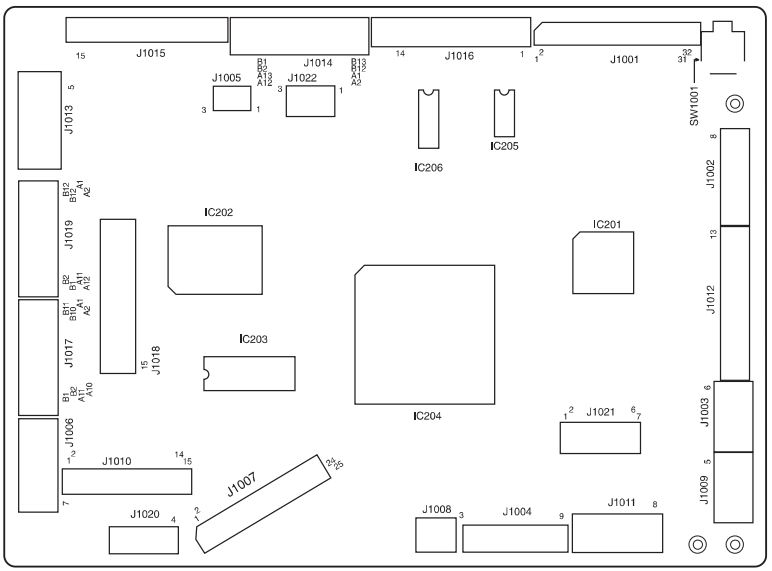


Figure 7-32 **DC controller PCB connectors**

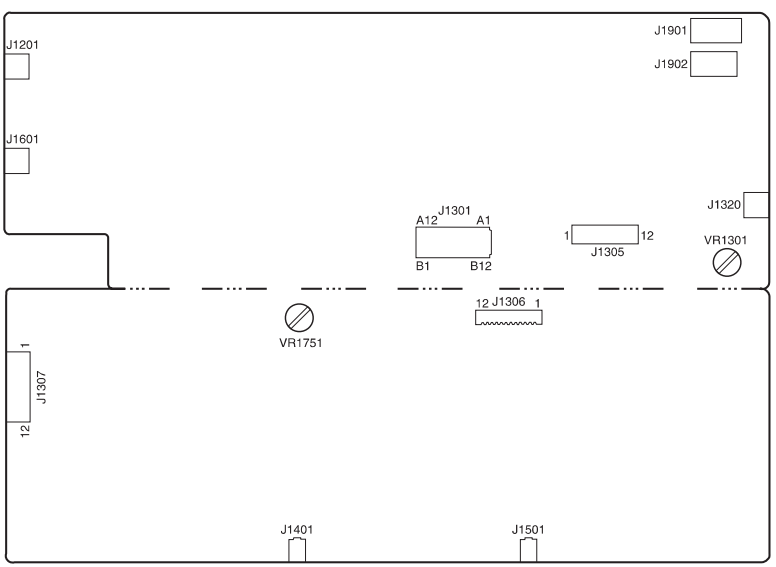


Figure 7-33 **High voltage PCB connectors**

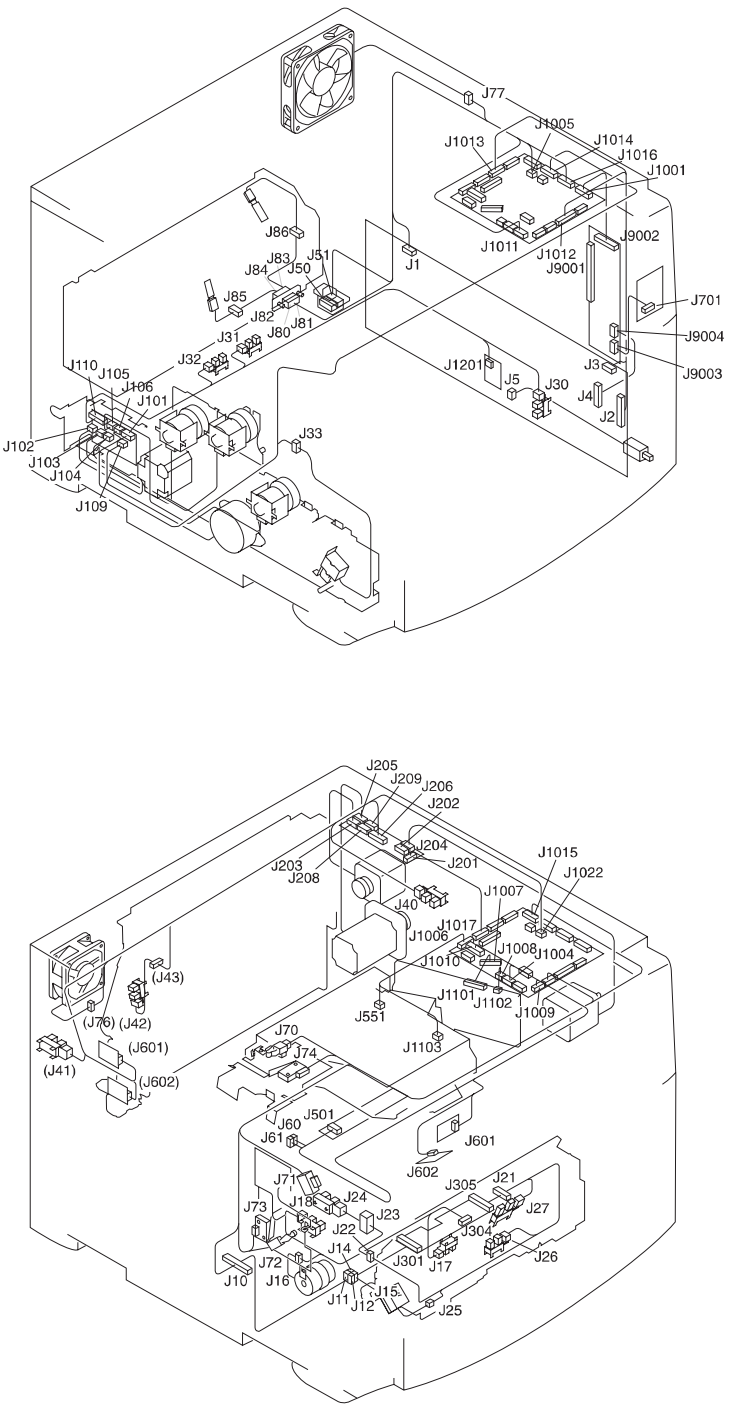


Figure 7-34 General location of connectors

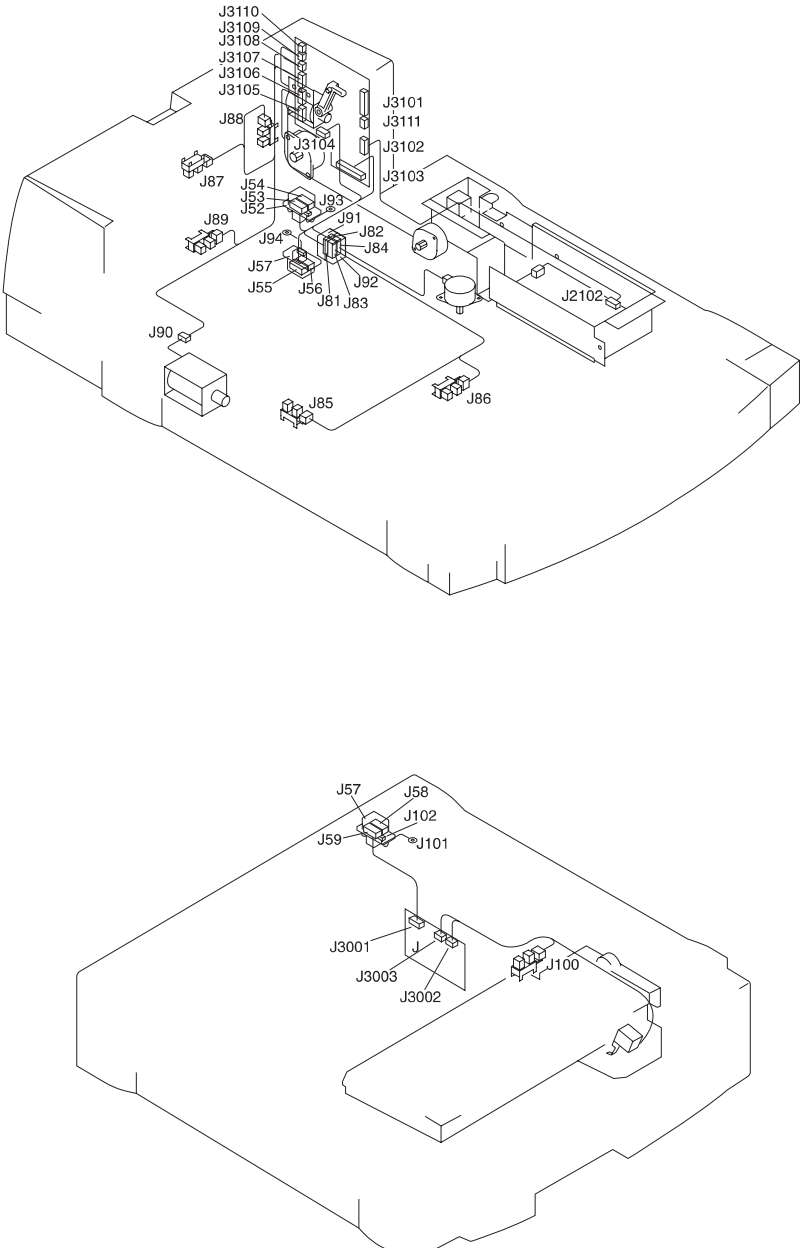


Figure 7-35 General location of duplexer and 500-sheet paper feeder connectors

General circuit diagrams

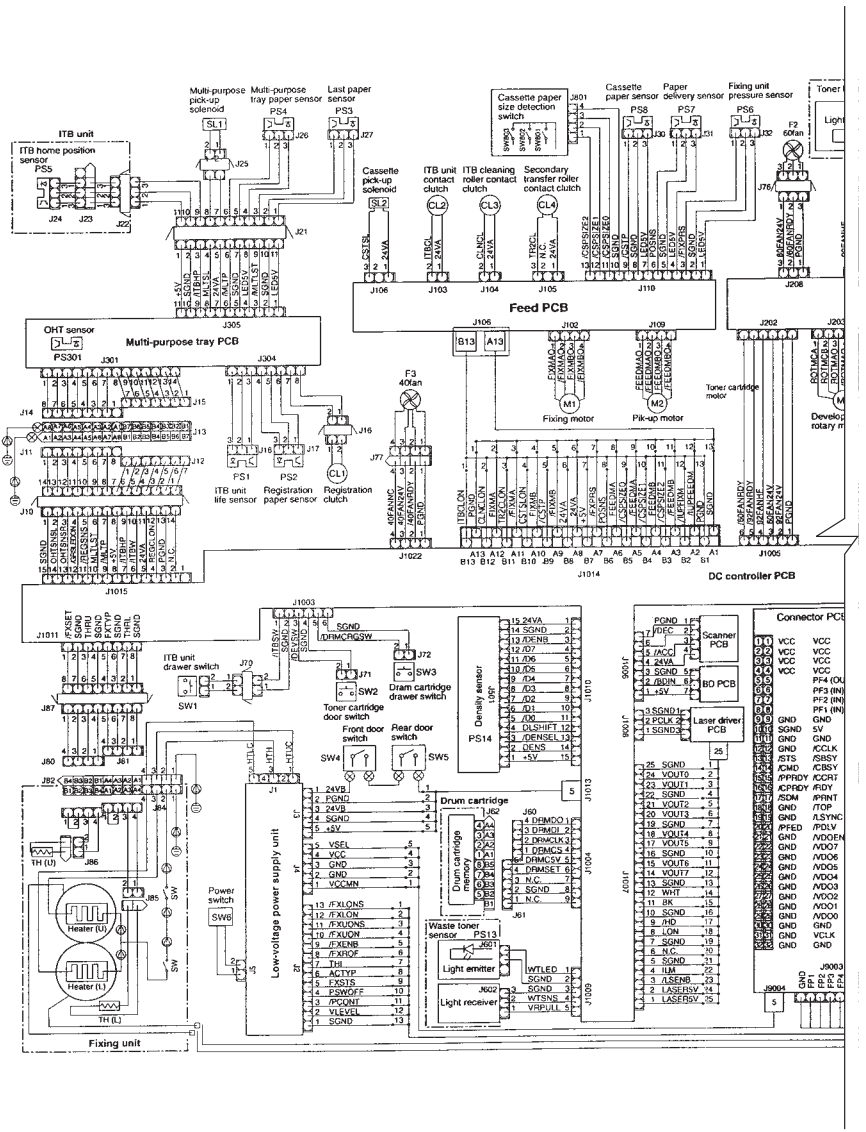


Figure 7-36 **Main wiring diagram (1 of 2)**

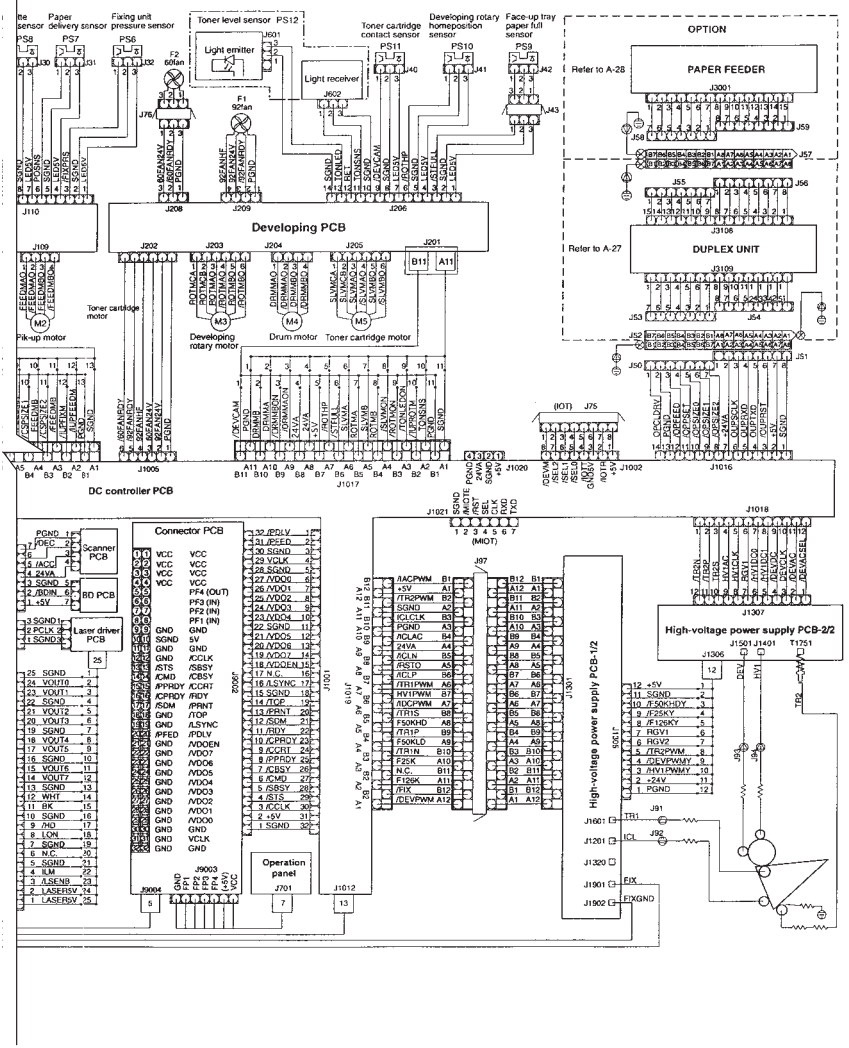


Figure 7-37 Main wiring diagram (2 of 2)

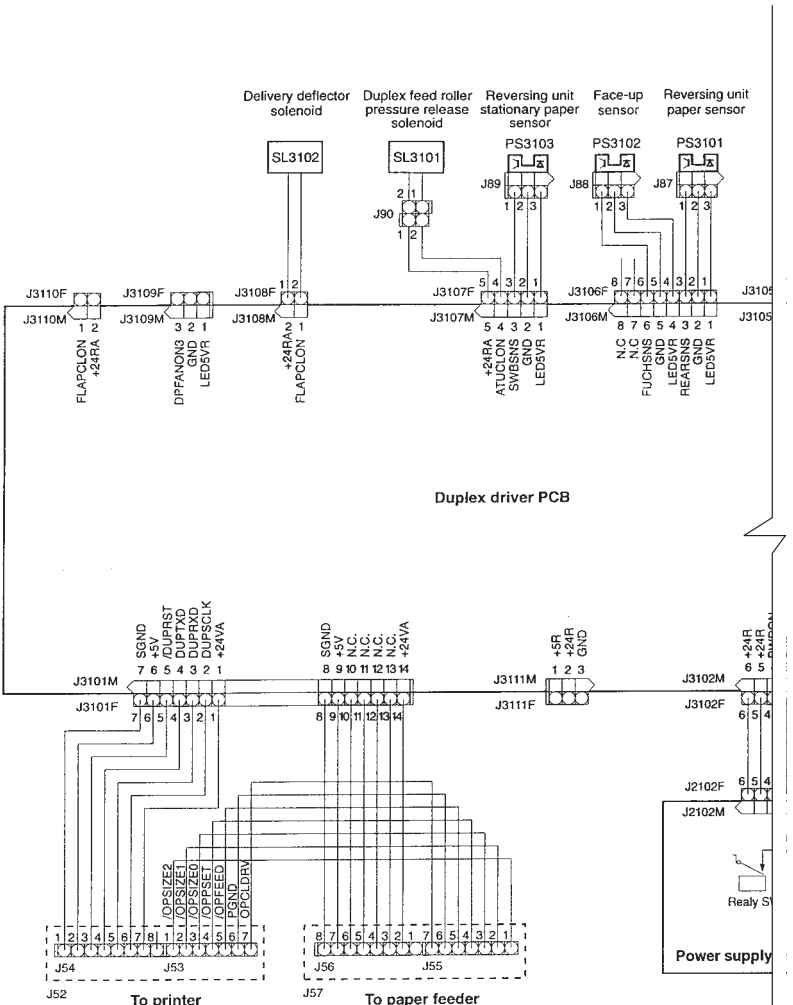


Figure 7-38 **Duplex printing accessory wiring diagram (1 of 2)**

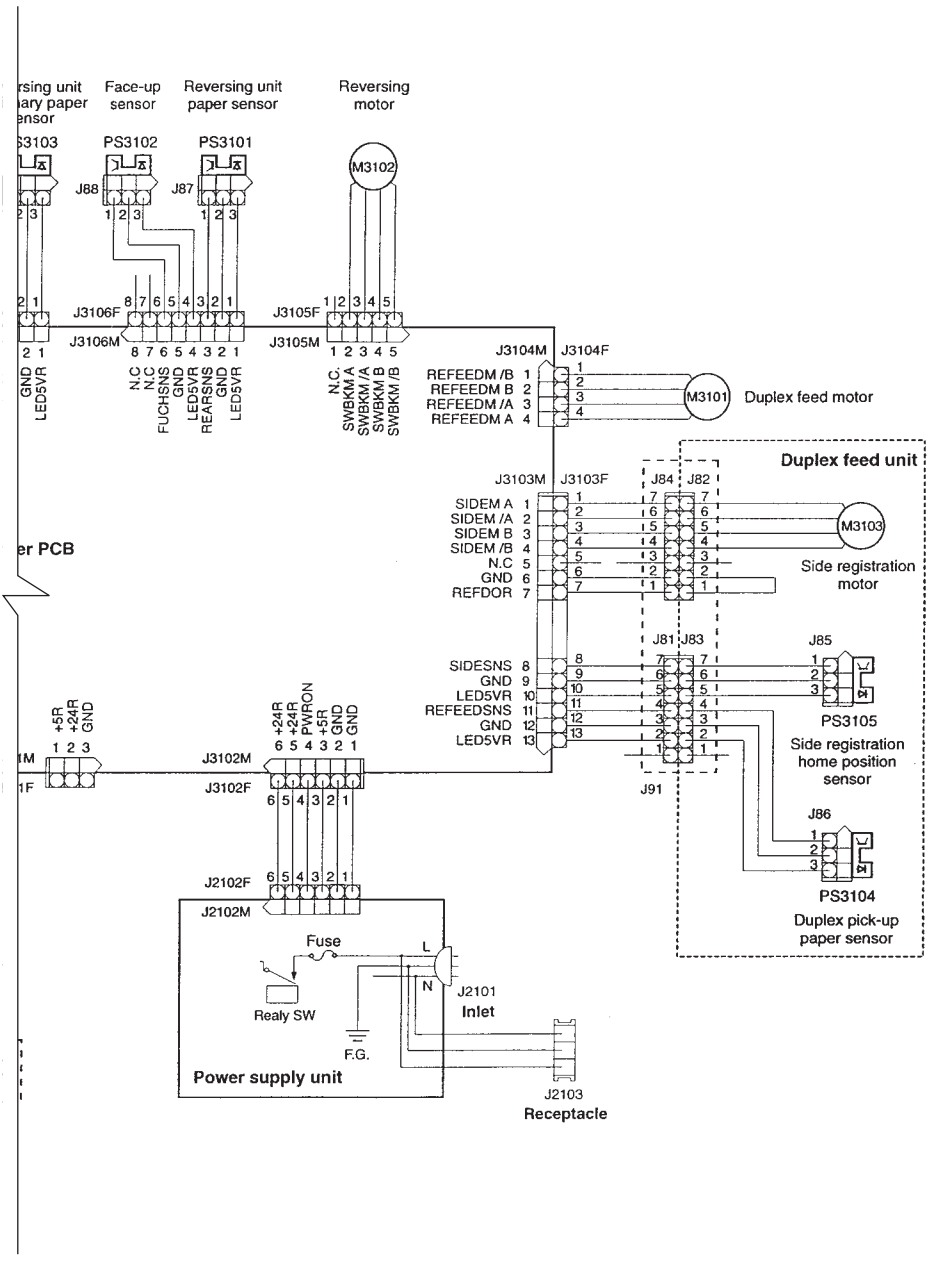


Figure 7-39 Duplex printing accessory wiring diagram (2 of 2)

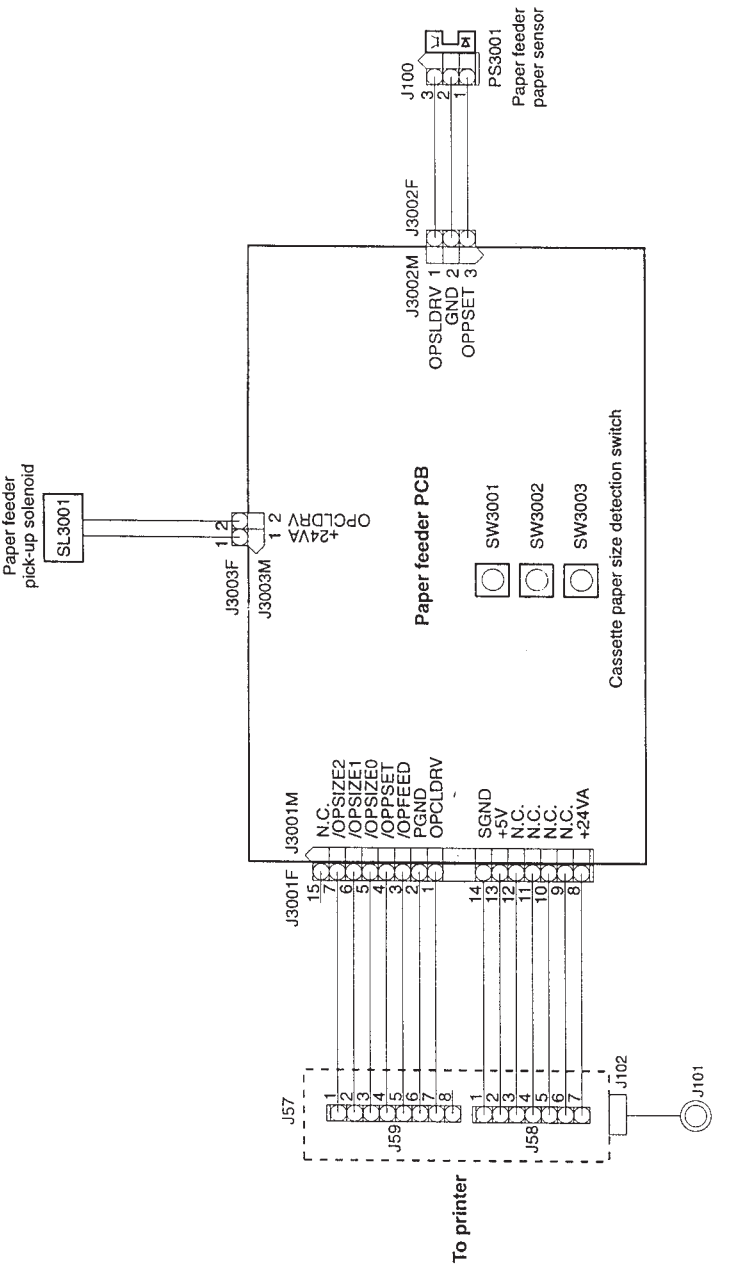


Figure 7-40 **500-sheet feeder wiring diagram**

8 Parts and diagrams

Chapter contents

Overview 317
Ordering parts 318
Consumables, accessories, and supplies 318
Common fasteners. 323
Illustrations and parts lists 324
Alphabetical parts list 347
Numerical parts list. 352

Overview

The figures in this chapter illustrate the major subassemblies in the printer and their component parts. A table (materials list) follows each exploded assembly diagram. Each table lists the reference designator (item number) for each part, the associated part number, quantity, and description of the part.

Note When looking for a part number, pay careful attention to the voltage listed in the description column to ensure that the part number selected is for the correct printer model.

Ordering parts

All standard part numbers are stocked an can be ordered from Support materials organization (SMO) or Support materials europe (SME). For information on contacting SMO or SME, see page 33.

Note Parts that have no reference designator or part number are not field replaceable and cannot be ordered.

Consumables, accessories, and supplies

The items listed in Table 8-1 and Table 8-2 are available through your local authorized HP dealer. To find a dealer near you (or if your local dealer is temporarily out of stock), call the HP Customer Information Center at (1) (800) 752-0900.

Note See page 320 for documentation part numbers.

Note Order two sets of DIMMs if upgrading the printer memory; order one set of DIMMs if replacing memory.

Consumable parts and accessories are available directly from Hewlett-Packard at the following numbers:

- U.S.: (1)(800) 538-8787
- Canada: (1)(800) 387-3154, (Toronto) (416) 671-8383
- United Kingdom: 0734-441212

Contact your local HP Parts Coordinator for other local phone numbers.

Table 8-1 Consumable, accessories, and options

Product number	Description
Memory (DIMMS)	
C4140A	4 MB
C4141A	8 MB
C4142A	16 MB
C4143A	32 MB
C3913A	64 MB
Options	
C4082A	500-sheet input tray
C4083A	(two-sided printing) duplex unit
C4235A	HP Color LaserJet 4500 cabinet
Toner supplies	
C4191A	Black
C4192A	Cyan
C4193A	Magenta
C4194A	Yellow
Consumable items	
C4195A	Drum kit
C4196A	Transfer kit
C4197A	Fuser kit (110V)
C4198A	Fuser kit (220V)
Media	
C2934A	HP Color LaserJet Transparencies (letter)
C2936A	HP Color LaserJet Transparencies (A4)
C4179A	HP Color LaserJet Soft Gloss Paper (letter)
C4179B	HP Color LaserJet Soft Gloss Paper (A4)

Table 8-1 Consumable, accessories, and options (continued)

Product number	Description
Network connectivity	
J3110A	HP JetDirect 600N for ethernet (10Base-T [RJ-45])
J3111A	HP JetDirect 600N for ethernet (10Base-T [RJ-45] and 10Base-2 [BNC]) and LocalTalk (DIN-8)
J3112A	HP JetDirect 600N for Token Ring (DB9, RJ-45)
J3113A	HP JetDirect 600N for Fast Ethernet (10/100 Base-TX [RJ-45])
Cables	
C2946A	10 m (30 ft) parallel cable (IEEE-1284 compliant) with a 25-pin DB male to a (IEEE-1284C) male “C” connector
92215N	LocalTalk cable kit
92215S	DIN-8 printer cable (for Macintosh computers)
Reference materials	
5021-0368	*HP LaserJet Printer Family Paper Specification Guide*
5021-0337	*PCL/PJL Technical Reference Package*
5967-0831	*HP JetDirect Print Server Software Installation Guide*
C4084-90937	*HP 4500/4500 N/4500 DN User Guide*
Localized font DIMMS	
5062-4667	Greek (1 MB)
5062-4668	Hebrew (1 MB)
5062-4669	Cyrillic (1 MB)
5062-4670	Arabic (1 MB)
C4292A (CAS)	Traditional Chinese (8 MB)
C4293A (CAS)	Simplified Chinese (8 MB)
YS-90210	Japanese (8 MB)

Table 8-2 Consumable and accessory part numbers

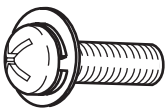
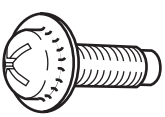
Product number	Description
Memory (DIMMS)	
C4140-67901	4 MB
C4141-67901	8 MB
C4142-67901	16 MB
C4143-67901	32 MB
C3913-67901	64 MB
Network connectivity	
J3110-60001	HP JetDirect 600N for ethernet (10Base-T [RJ-45])
J3111-60001	HP JetDirect 600N for ethernet (10Base-T [RJ-45] and 10Base-2 [BNC]) and LocalTalk (DIN-8)
J3112-60001	HP JetDirect 600N for Token Ring (DB9, RJ-45)
J3113-60001	HP JetDirect 600N for Fast Ethernet (10/100 Base-TX [RJ-45])
Toner supplies	
R94-4005-410CN	Black
R94-4004-410CN	Cyan
R94-4003-410CN	Magenta
R94-4002-410CN	Yellow
Consumable items	
R94-4001-410CN	Drum kit
R96-5009-000CN	Transfer kit
R96-5007-000CN	Fuser kit (110V)
R96-5008-000CN	Fuser kit (220V)

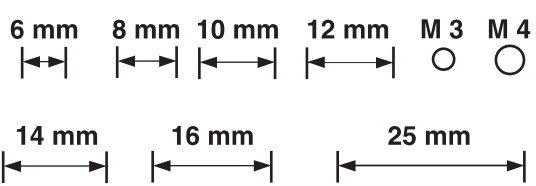
Table 8-2 Consumable and accessory part numbers (continued)

Product number	Description
Panel overlays	
C4084-40001	English
C4084-40005	German
C4084-40003	French
C4084-40006	Spanish
C4084-40004	Italian
C4084-40015	Korean
C4084-40018	Simplified Chinese
C4084-40014	Traditional Chinese
C4084-40011	Swedish
C4084-40007	Dutch
C4084-40009	Finnish
C4084-40016	Russian
C4084-40008	Danish
C4084-40010	Norwegian
C4084-40012	Portuguese
C4084-40017	Czech
C4084-40013	Polish
C4084-40020	Japanese

Common fasteners

Table 8-3 Types of screws

Illustration	Description	Size	Uses
	Screw, machine w/washer	M3X6 M3X10 M3X12 M3X14	To hold plastic to metal, ex. the skins
	Screw, self tapping	M4X8 M4X10	To hold plastic to metal, ex. control panel
	Screw, trus head	M3X4 M3X6 M3X8	Sheet metal to sheet metal, ex. formatter pan
	Retaining Ring (e-type)		To hold gears into place



Illustrations and parts lists

The following illustrations and their assorted parts tables list the field replaceable units (FRU) for this printer. At the end of this chapter, there are two cross-reference tables of all of the parts listed in this chapter: Table 8-19 lists the parts in alphabetical order, and Table 8-20 lists the parts in numerical order by part number. Both tables are cross-referenced to the appropriate figure and reference designator in this chapter.

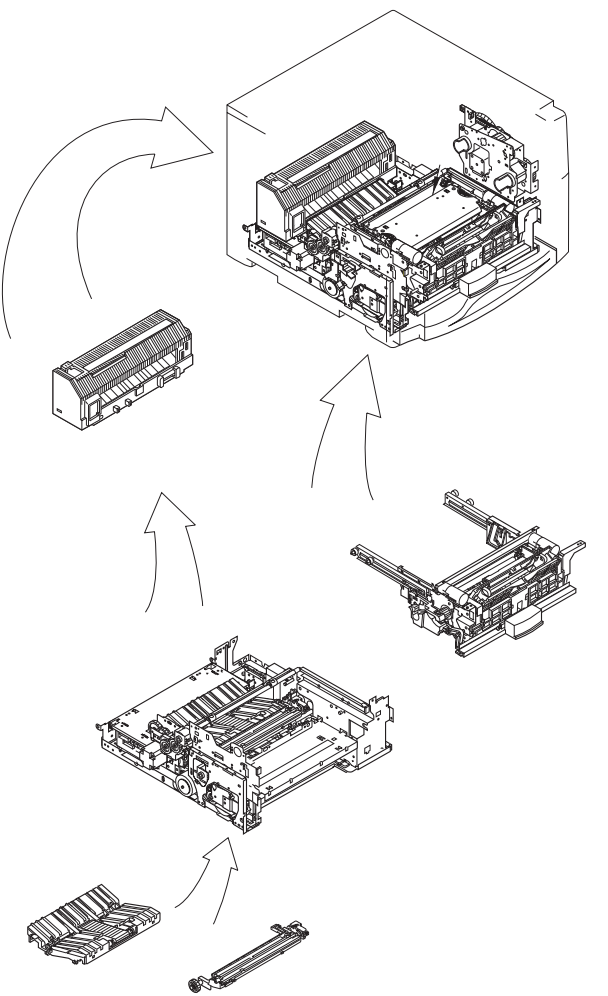


Figure 8-1 **Assembly location diagram (1 of 2)**

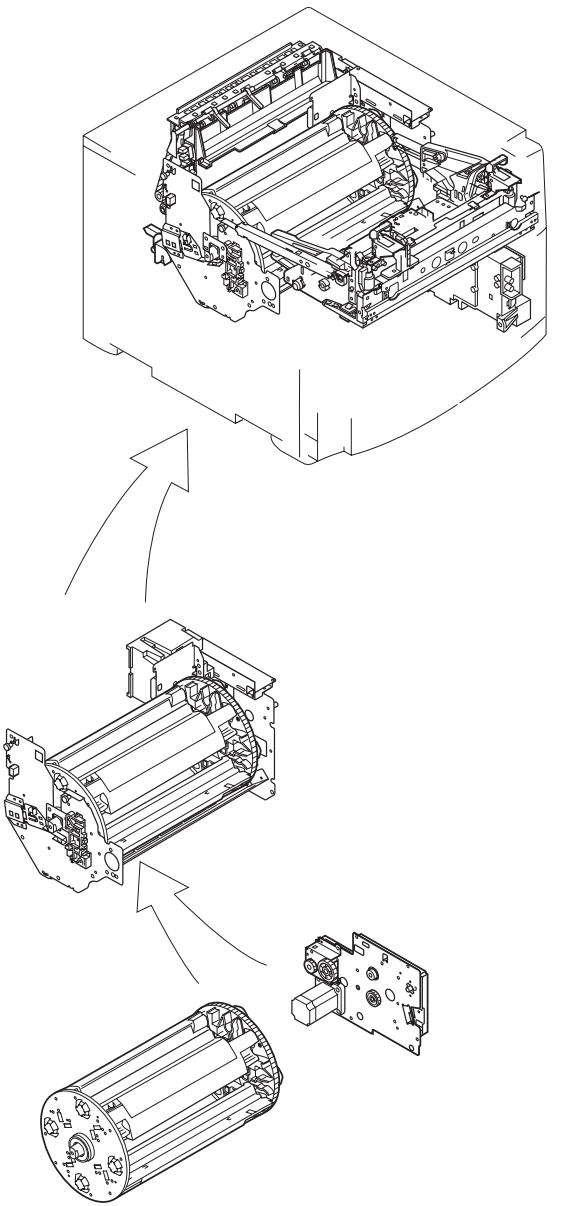


Figure 8-2 **Assembly location diagram (2 of 2)**

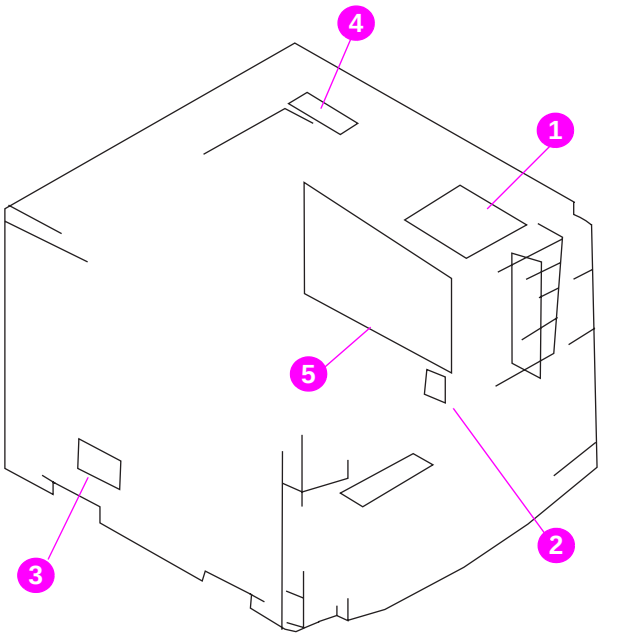


Figure 8-3 PCB locations

Table 8-4 PCB assembly

Ref.	Description	Qty.	Part number
1	DC controller PCB	1	RG5-3809-000CN
2	Paper size sensor PCB	1	RG5-3816-000CN
3	Paper feed PCB	1	RG5-3810-000CN
4	Developing PCB	1	RG5-3811-000CN
5	Formatter PCB	1	C4080-69001CN

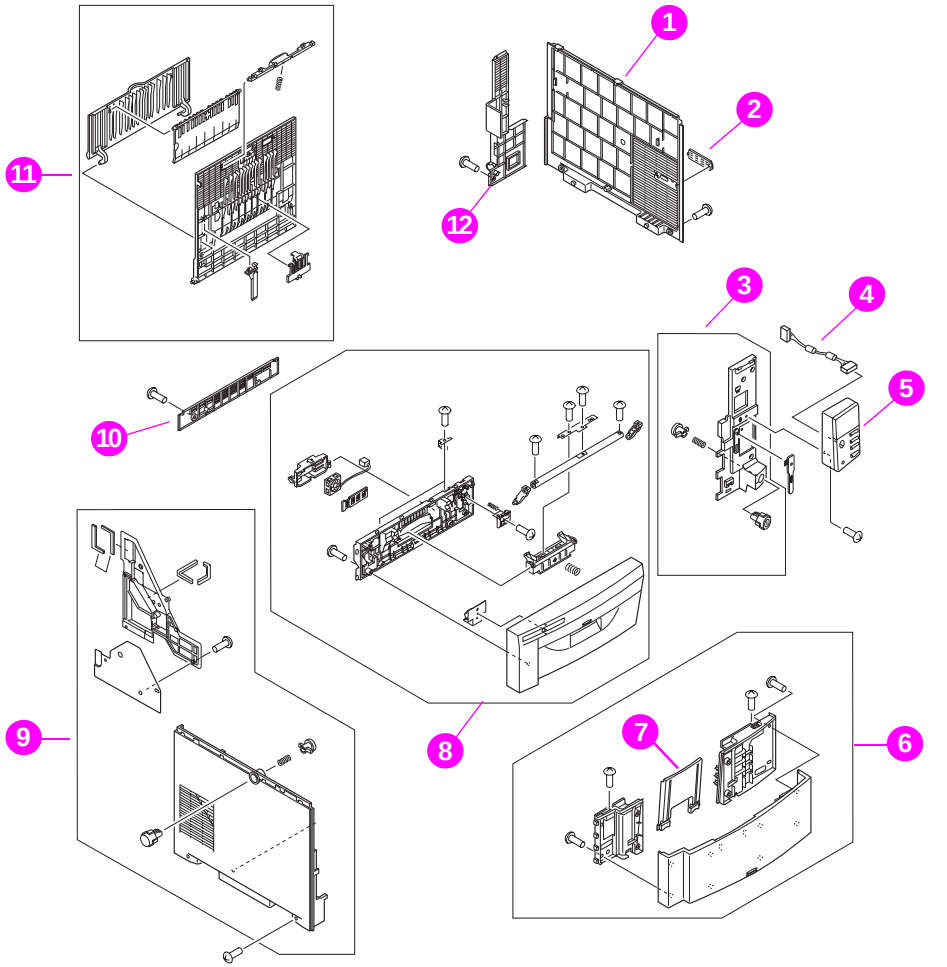


Figure 8-4 **External covers, panels, etc.**

Table 8-5 Printer cover and door

Ref.	Description	Qty.	Part number
1	Cover, right side	1	RB2-1203-000CN
2	Cover, connector	1	RB2-1224-000CN
3	Cover, right front	1	RG5-3310-000CN
4	Cable, control panel	1	RG5-3802-000CN
5	Control panel assembly	1	RG5-3345-000CN
6	Cover, ITB drawer	1	RG5-3320-000CN

Table 8-5 Printer cover and door (continued)

Ref.	Description	Qty.	Part number
7	Tray, extension	1	RB2-1215-000CN
8	Cover, drum drawer	1	RG5-3315-000CN
9	Cover, left side	1	RG5-3313-000CN
10	Cover, lower rear	1	RB2-1206-000CN
11	Door, rear access	1	RG5-3325-000CN
12	Cover, rear	1	RB2-1205-000CN

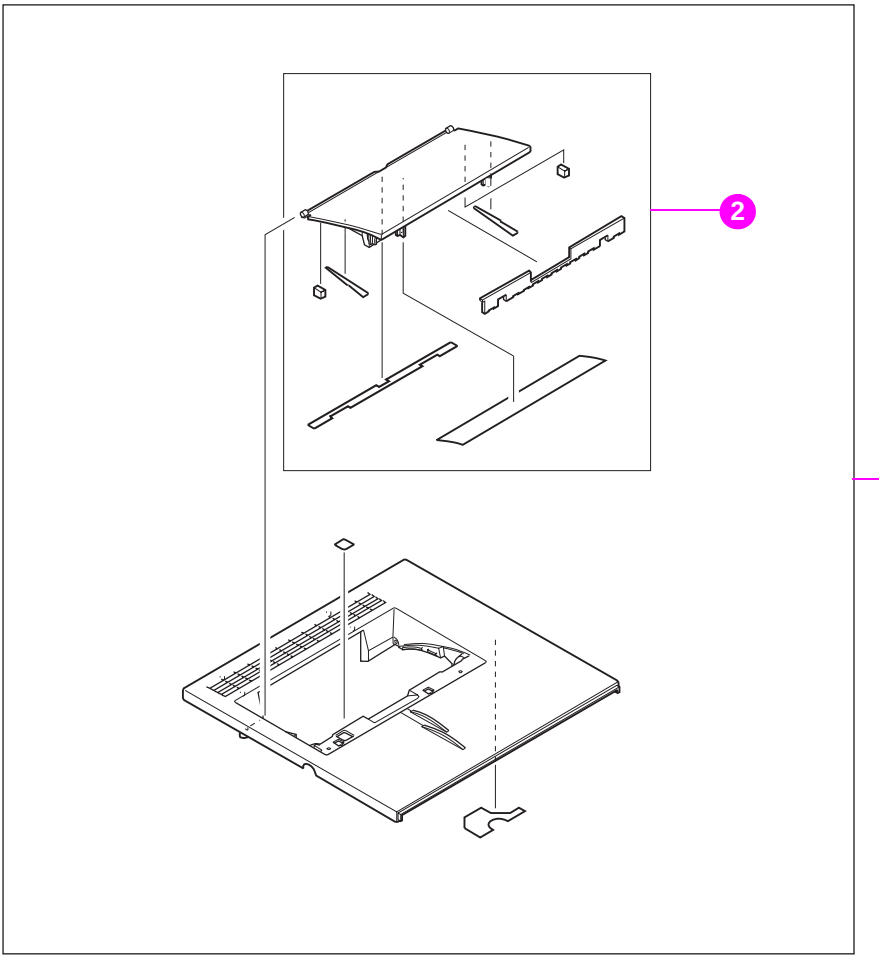


Figure 8-5 **Top Cover Assembly**

Table 8-6 Top cover components

Ref.	Description	Qty.	Part number
1	Cover, top assembly	1	RG5-3300-000CN
2	Cover, rear	1	RF5-2076-000CN

)

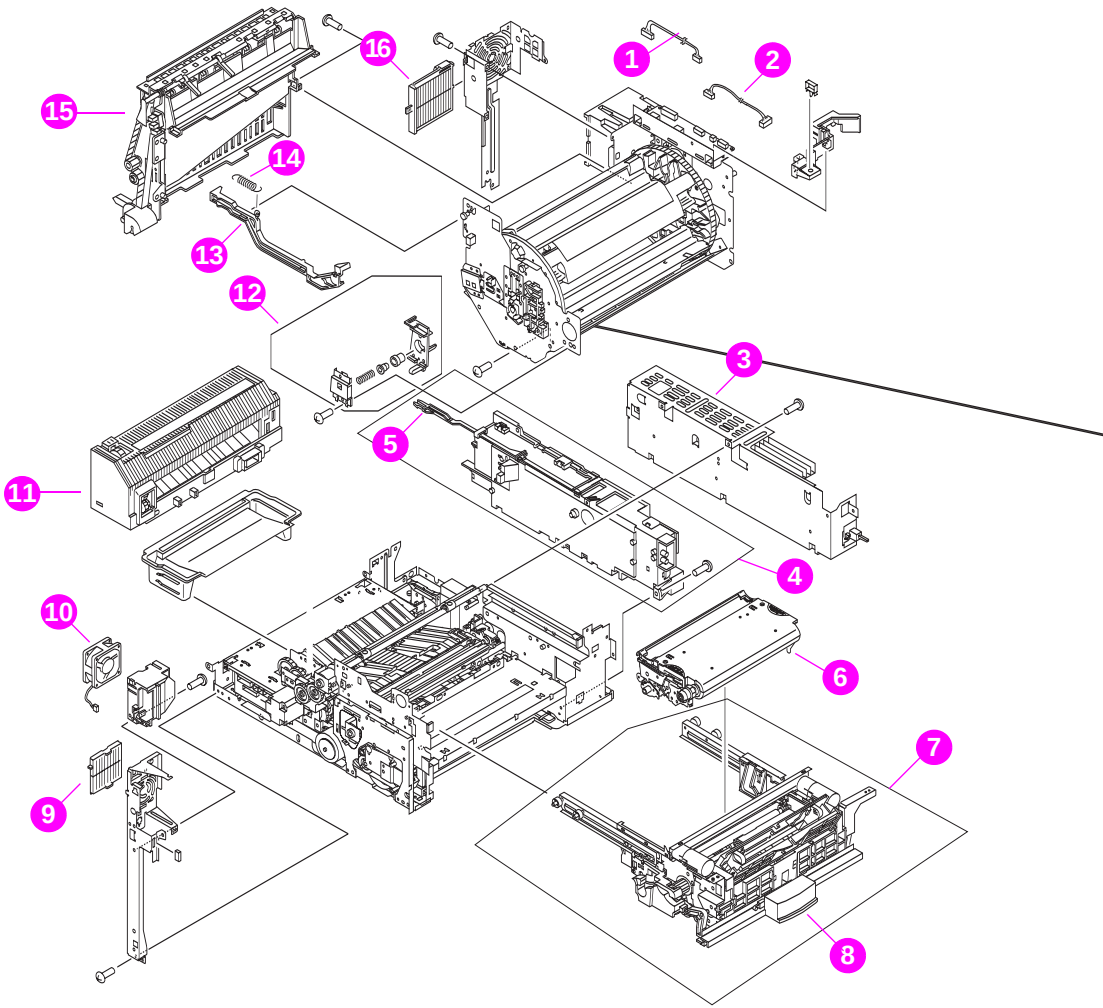


Figure 8-6 **Internal components (1 of 3)**

Table 8-7 Internal components (1 of 3)

Ref.	Description	Qty.	Part number
1	Cable, fan	1	RG5-3887-000CN
2	Cable, developer	1	RG5-3783-000CN
3	Power supply, 110V	1	RH3-2189-000CN
3	Power supply, 220V	1	RH3-2190-000CN
4	High voltage power supply	1	RG5-3285-000CN

Table 8-7 Internal components (1 of 3) (continued)

Ref.	Description	Qty.	Part number
5	Strap, cover support	1	RB2-1556-000CN
6	ITB assembly	1	RG5-3397-000CN
7	ITB drawer assembly	1	RG5-3190-000CN
8	Handle, ITB drawer	1	RB2-1361-000CN
9	Filter, air (small)	1	RB2-1283-000CN
10	Fan, small	1	RH7-1407-000CN
11	Fuser, 110V	1	RG5-3250-000CN
11	Fuser, 220V	1	RG5-3251-000CN
12	Drum bushing assembly	1	RG5-3319-000CN
13	Rod, delivery	1	RB2-1284-000CN
14	Spring, tension	1	RS5-2754-000CN
15	Face-down delivery assembly	1	RG5-3335-000CN
16	Filter, air (large)	1	RB2-1282-000CN

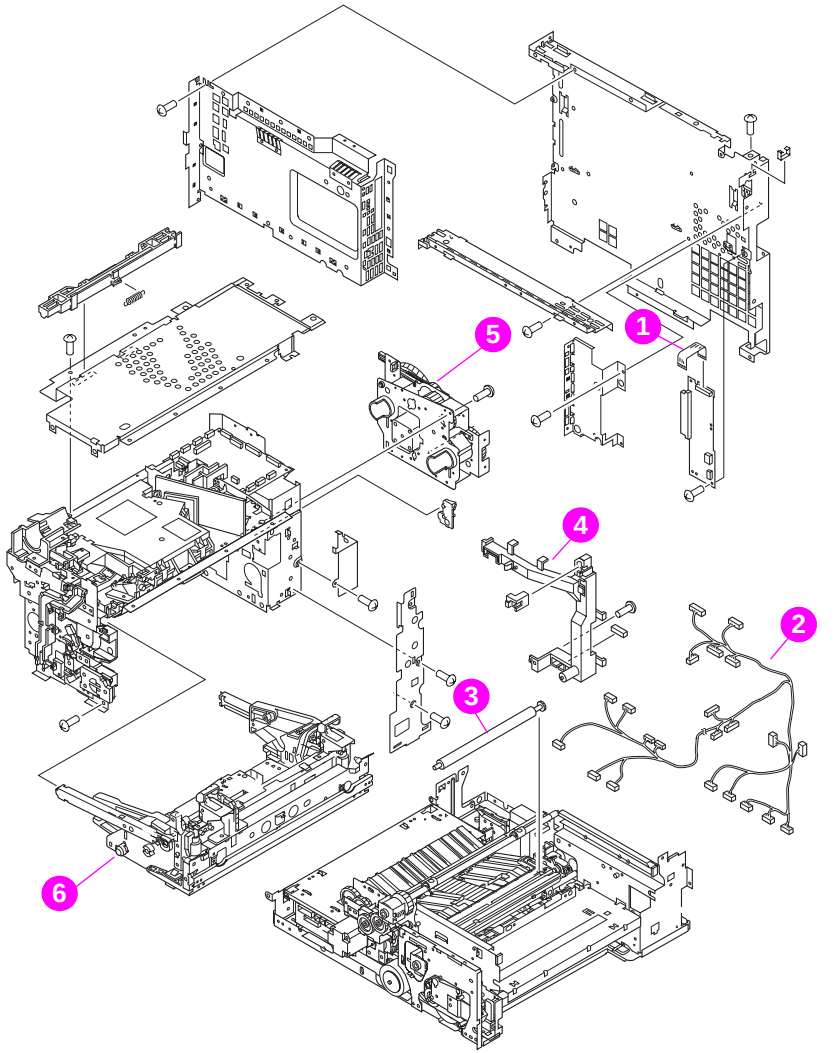


Figure 8-7 **Internal components (2 of 3)**

Table 8-8 Internal components (2 of 3)

Ref.	Description	Qty.	Part number
1	Cable, videointerface	1	RH2-5335-000CN
2	Main cable	1	RG5-3781-000CN
3	Roller, transfer	1	RF5-2112-000CN
4	Guide, cable	1	RB2-1277-000CN
5	Drum drive assembly	1	RG5-3170-000CN

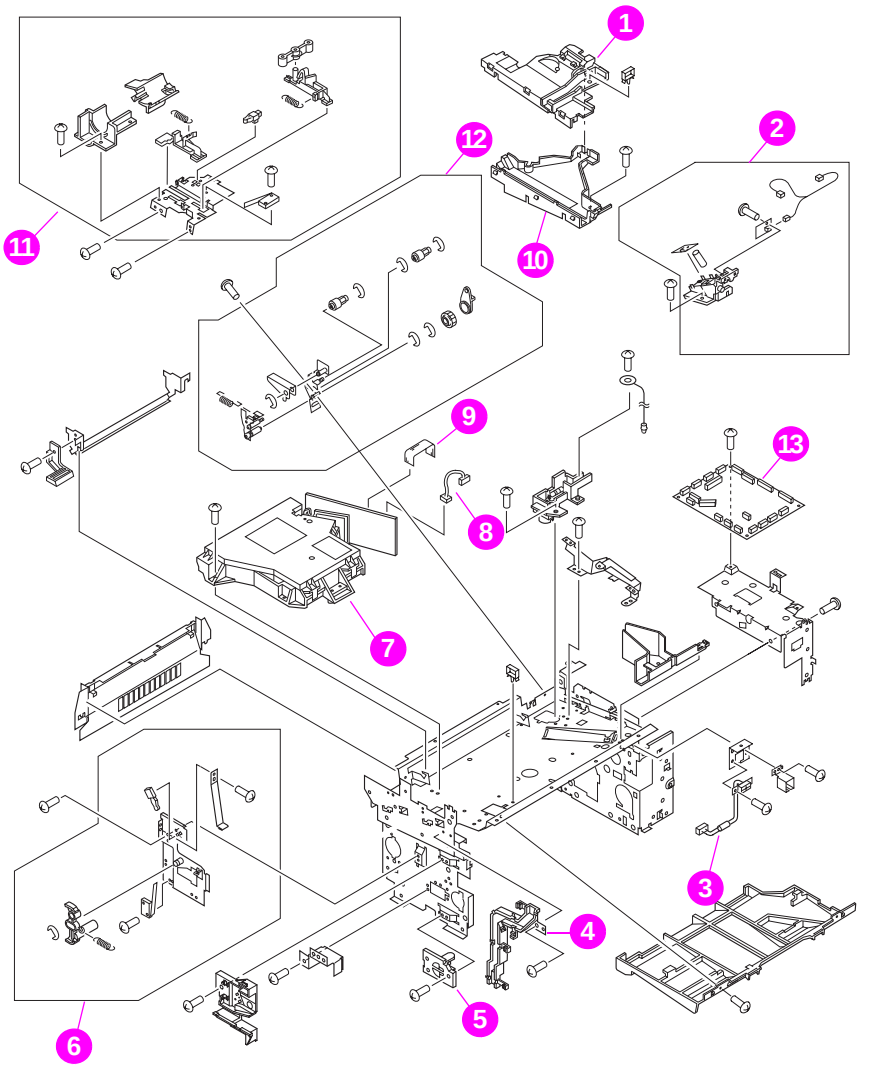


Figure 8-8 **Internal components (3 of 3)**

Table 8-9 Internal components (3 of 3)

Ref.	Description	Qty.	Part number
1	Guide, upper cable	1	RB2-1457-000CN
2	Sensor, waste toner	1	RG5-3292-000CN
3	Cable, fan	1	RG5-4650-000CN
4	Cover, cable	1	RB2-1180-000CN

Table 8-9 Internal components (3 of 3) (continued)

Ref.	Description	Qty.	Part number
5	Bushing	1	RB2-1158-000CN
6	Drawer switch assembly	1	RG5-3296-000CN
7	Laser/scanner assembly	1	RG5-3160-000CN
8	Cable, laser	1	RG5-3782-000CN
9	Cable, laser (flat)	1	RH2-5334-000CN
10	Guide, cable (lower)	1	RB2-1456-000CN
11	Door switch assembly	1	RG5-3291-000CN
12	Brake assembly	1	RG5-3309-000CN
13	DC controller PCB	1	RG5-3809-000CN

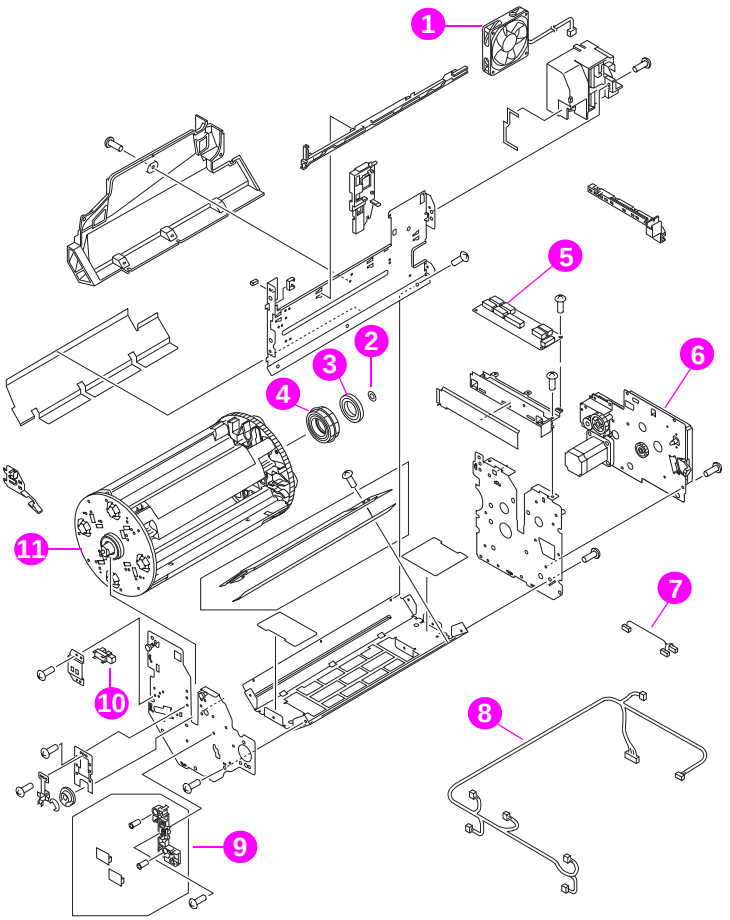


Figure 8-9 **Developing rotary assembly**

Table 8-10 Developing rotary assembly

Ref.	Description	Qty.	Part number
1	Fan, large	1	RH7-1346-000CN
2	Spacer	1	RS5-6210-000CN
3	Bearing, ball	1	XG9-0361-000CN
4	Gear, 125T	1	RS6-0176-000CN
5	Developing PCB	1	RG5-3811-000CN
6	Rotary drive assembly	1	RG5-3360-000CN
7	Cable fusing connector	1	RG5-3886-000CN

Table 8-10 Developing rotary assembly (continued)

Ref.	Description	Qty.	Part number
8	Cable, rotary	1	RG5-3795-000CN
9	Toner sensor assembly	1	RG5-3355-000CN
10	Sensor, carousel position	1	WG8-5362-000CN
11	Rotary assembly	1	RG5-3370-000CN

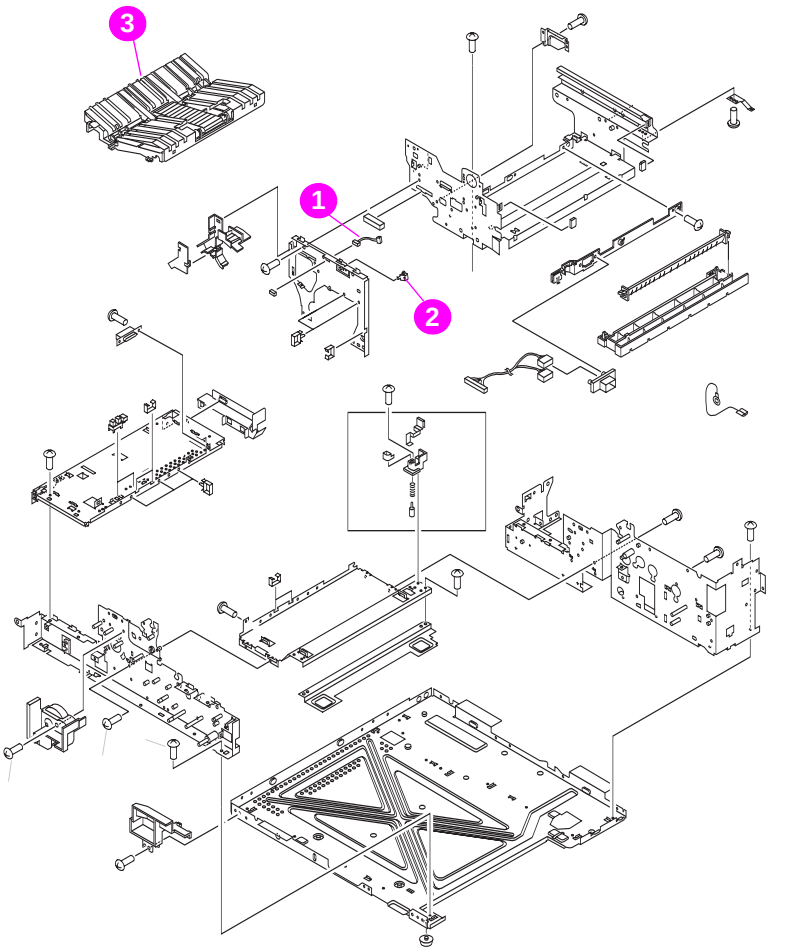


Figure 8-10 Paper pick-up assembly (1 of 3)

Table 8-11 Paper pick-up assembly (1 of 3)

Ref.	Description	Qty.	Part number
1	Cable, ITB switch	1	RG5-4651-000CN
2	Microswitch, ITB	1	WC2-5330-000CN
3	Feeder assembly	1	RG5-3226-000CN

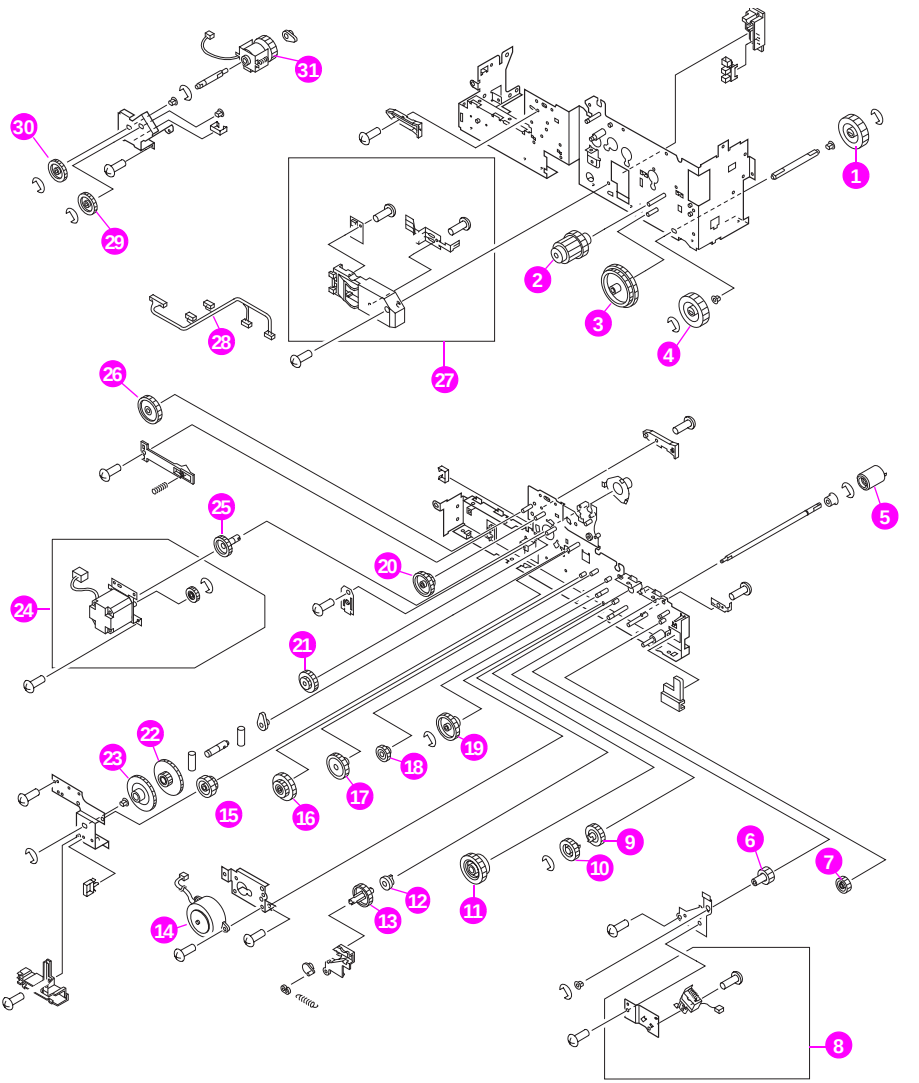


Figure 8-11 **Paper pick-up assembly (2 of 3)**

Table 8-12 Paper pick-up assembly (2 of 3)

Ref.	Description	Qty.	Part number
1	Gear, 17T	2	RS6-0158-000CN
2	Gear, 18T/14T	1	RS6-0157-000CN
3	Gear, 53T/46T	1	RS6-0156-000CN
4	Gear, 17T	1	RS6-0158-000CN
5	Roller	1	RF5-2092-000CN

Table 8-12 Paper pick-up assembly (2 of 3) (continued)

Ref.	Description	Qty.	Part number
6	Gear, 18T	1	RS6-0140-000CN
7	Gear, 19T	1	RS6-0141-000CN
8	Solenoid assy (SL2)	1	RG5-3245-000CN
9	Gear, 27T	1	RS6-0135-000CN
10	Gear, 27T	1	RS6-0135-000CN
11	Gear, 30T/16T	1	RS6-0134-000CN
12	Bushing	2	RS5-1293-000CN
13	Gear, 31T	1	RS6-0136-000CN
14	Motor(M2), stepping	1	RH7-1343-000CN
15	Gear, 47T	1	RS6-0147-000CN
16	Gear, 24T/37T	1	RS6-0163-000CN
17	Gear, 35T	1	RS6-0132-000CN
18	Gear, 20T	1	RS6-0138-000CN
19	Gear, 37T/14T	1	RS6-0133-000CN
20	Gear, 34T/15T	1	RS6-0144-000CN
21	Gear, 29T/17T	1	RS6-0145-000CN
22	Gear, 18T/52T	1	RS6-0148-000CN
23	Gear, 52T	1	RS6-0146-000CN
24	Motor (M1), fusing assembly	1	RG5-3227-000CN
25	Gear, 26T	1	RS6-0149-000CN
26	Gear, 37T	1	RS6-0143-000CN
27	Sensor, paper size	1	RG5-3234-000CN
28	Cable, paper feed	1	RG5-3785-000CN
29	Gear, 29T	1	RS6-0150-000CN
30	Gear, 29T	1	RS6-0150-000CN
31	Clutch (CL2), electromagnetic	1	RH7-5176-000CN

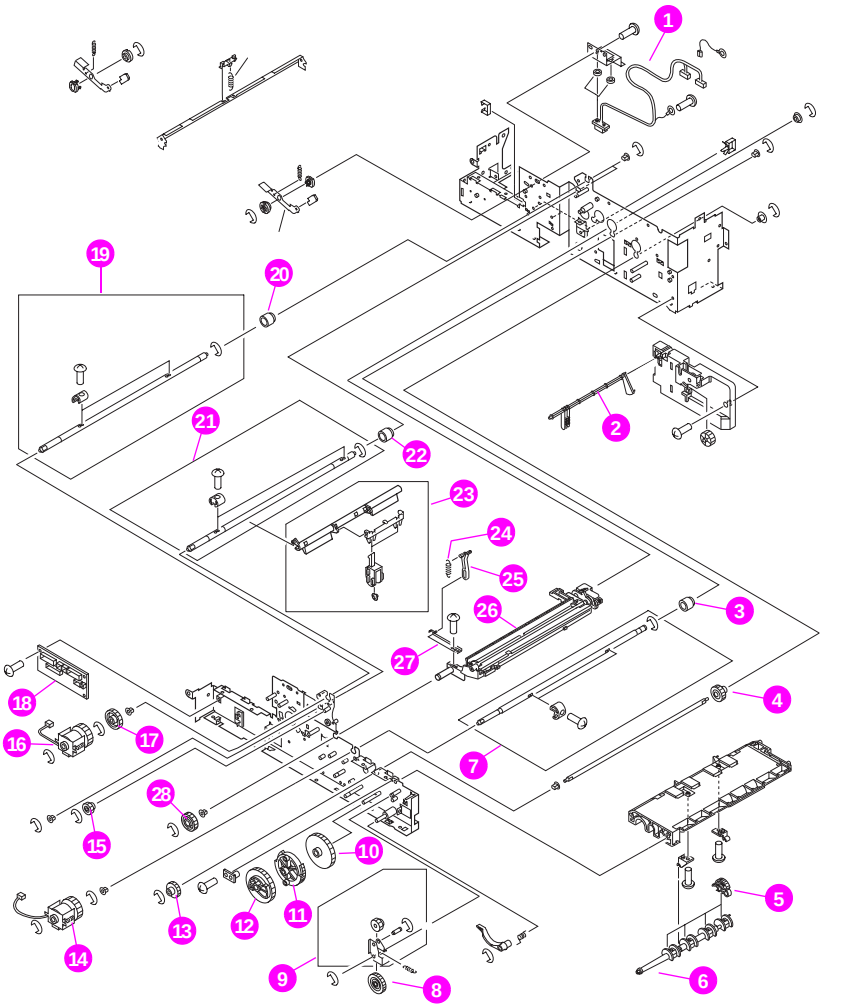


Figure 8-12 **Paper pick-up assembly (3 of 3)**

Table 8-13 Paper pick-up assembly (3 of 3)

Ref.	Description	Qty.	Part number
1	Cable, fusing/option	1	RG5-3787-000CN
2	Lever, sensor	1	RB2-0576-000CN
3	Clutch, one-way	1	RB2-0572-000CN
4	Gear, 18T	1	RS6-0139-000CN
5	Roller, paper pick	4	RB1-8865-000CN
6	Shaft, paper pick	1	RB2-0545-000CN

Table 8-13 Paper pick-up assembly (3 of 3) (continued)

Ref.	Description	Qty.	Part number
7	Transfer cam assembly	1	RG5-3240-000CN
8	Gear, 26T/18T	1	RS6-0137-000CN
9	Gear assembly	1	RG5-3228-000CN
10	Gear, 53T	1	RS6-0155-000CN
11	Gear, 39T/31T	1	RS6-0154-000CN
12	Gear, 49T	1	RS6-0153-000CN
13	Gear, 18T	1	RS6-0139-000CN
14	Clutch (CL4), electromagnetic	1	RH7-5180-000CN
15	Gear, 16T	1	RS6-0151-000CN
16	Clutch (CL3), electromagnetic	1	RH7-5178-000CN
17	Gear, 29T	1	RS6-0152-000CN
18	Paper feed PCB assembly	1	RG5-3810-000CN
19	ICL cam assembly	1	RG5-3242-000CN
20	Clutch, one-way	1	RB2-0561-000CN
21	ITB cam assembly	1	RG5-3241-000CN
22	Clutch, one-way	1	RB2-0561-000CN
23	Rowel swing assembly	1	RG5-4696-000CN
24	Spring tension	1	RB2-0614-000CN
25	Link rowel	1	RS5-2800-000CN
26	Transfer assembly, secondary	1	RF5-2138-000CN
27	Plate support	1	RG5-3235-000CN
28	26T	1	RS6-0159-000CN

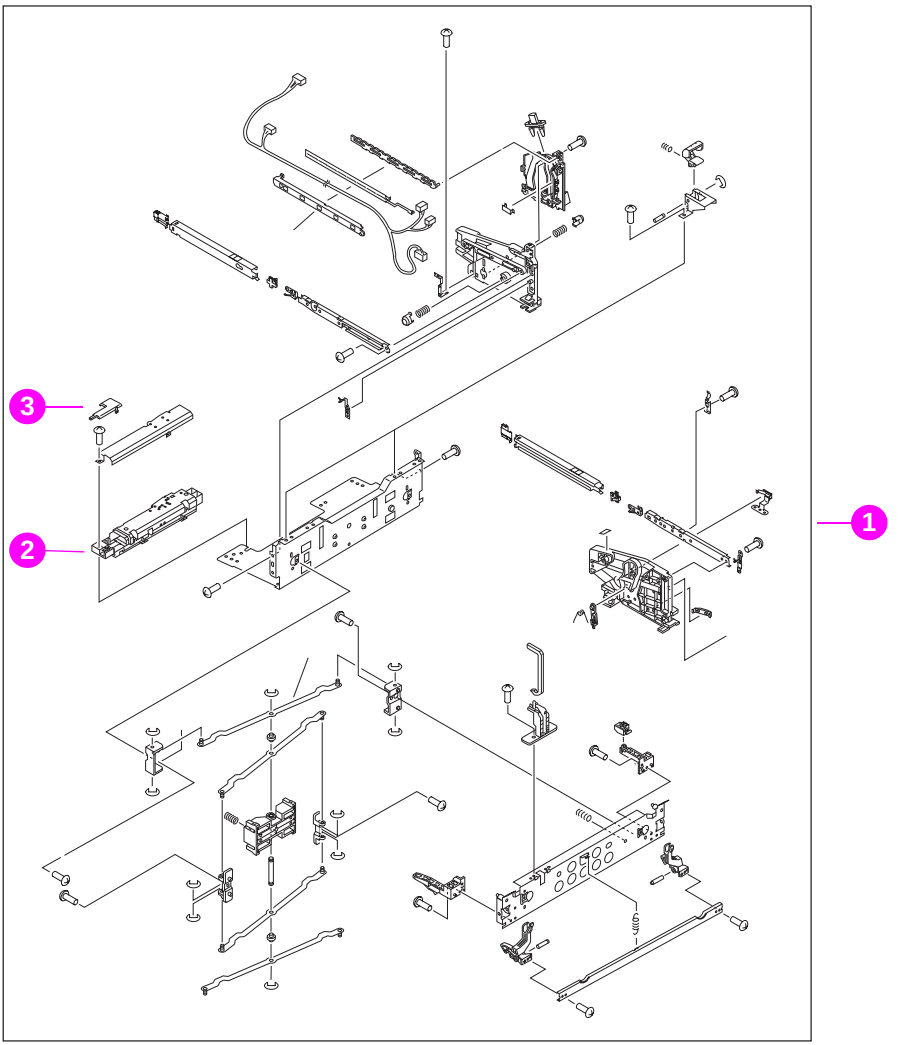


Figure 8-13 **Upper drawer assembly**

Table 8-14 Upper drawer assembly

Ref.	Description	Qty.	Part number
1	Drum drawer assembly	1	RG5-3270-000CN
2	Density sensor assembly	1	RG5-3281-000CN
3	Cover, connector	1	RB2-0916-000CN

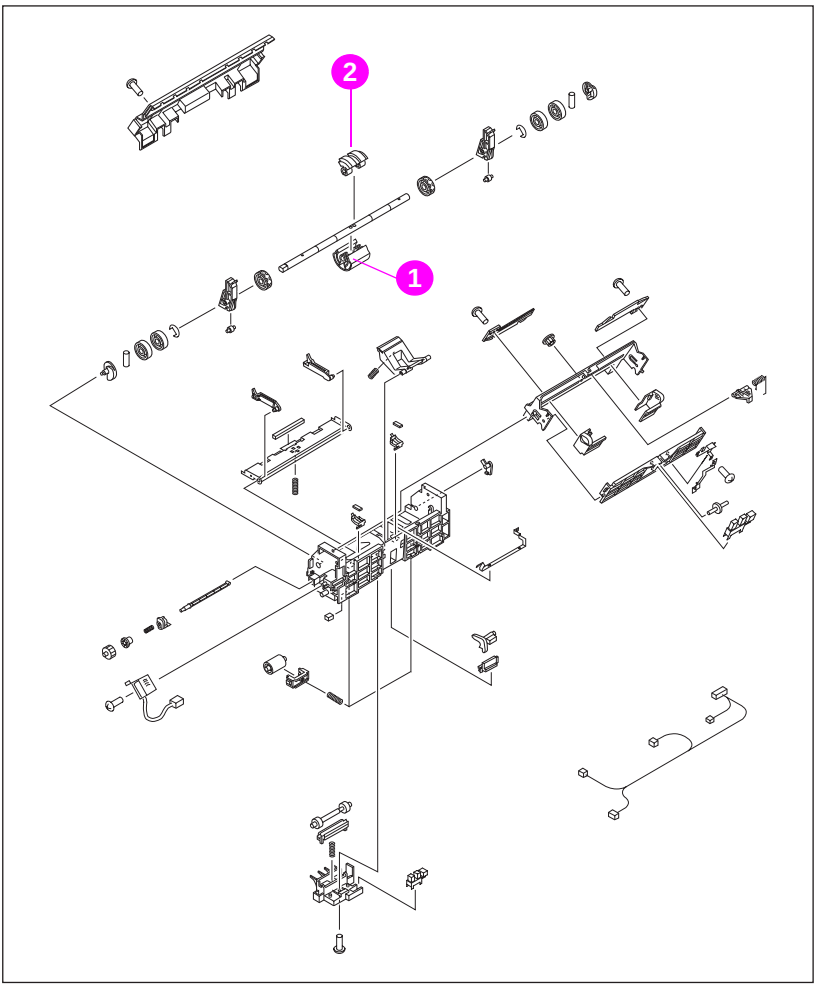


Figure 8-14 MP tray paper pick-up assembly

Table 8-15 MP tray paper pick-up assembly

Ref.	Description	Qty.	Part number
1	Roller	1	RB2-0744-000CN
2	Roller	1	RB2-0717-000CN

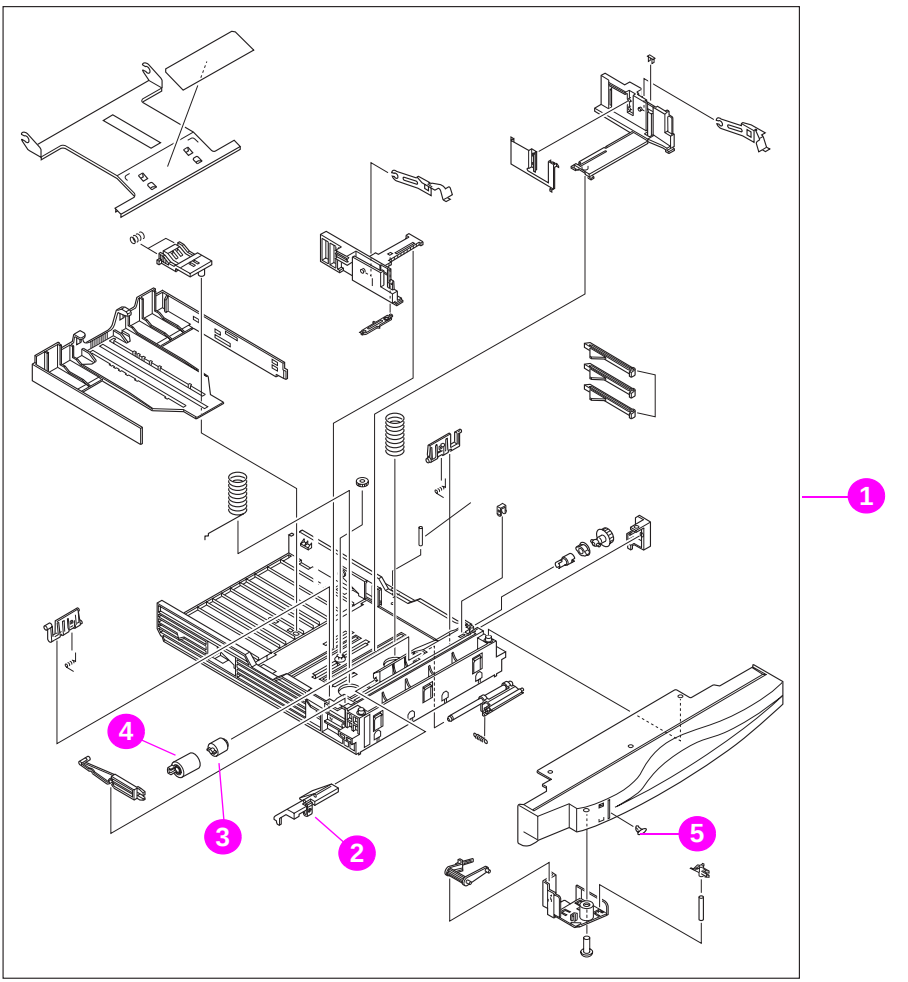


Figure 8-15 **Cassette**

Table 8-16 Cassette

Ref.	Description	Qty.	Part number
1	Cassette, 250 sheet	1	RG5-3400-000CN
2	Cover, roller	1	RB1-9001-000CN
3	Limiter, torque	1	RB1-8974-000CN
4	Roller, separation	1	RF5-2490-000CN
5	Indicator, paper level	1	RB1-9009-000CN

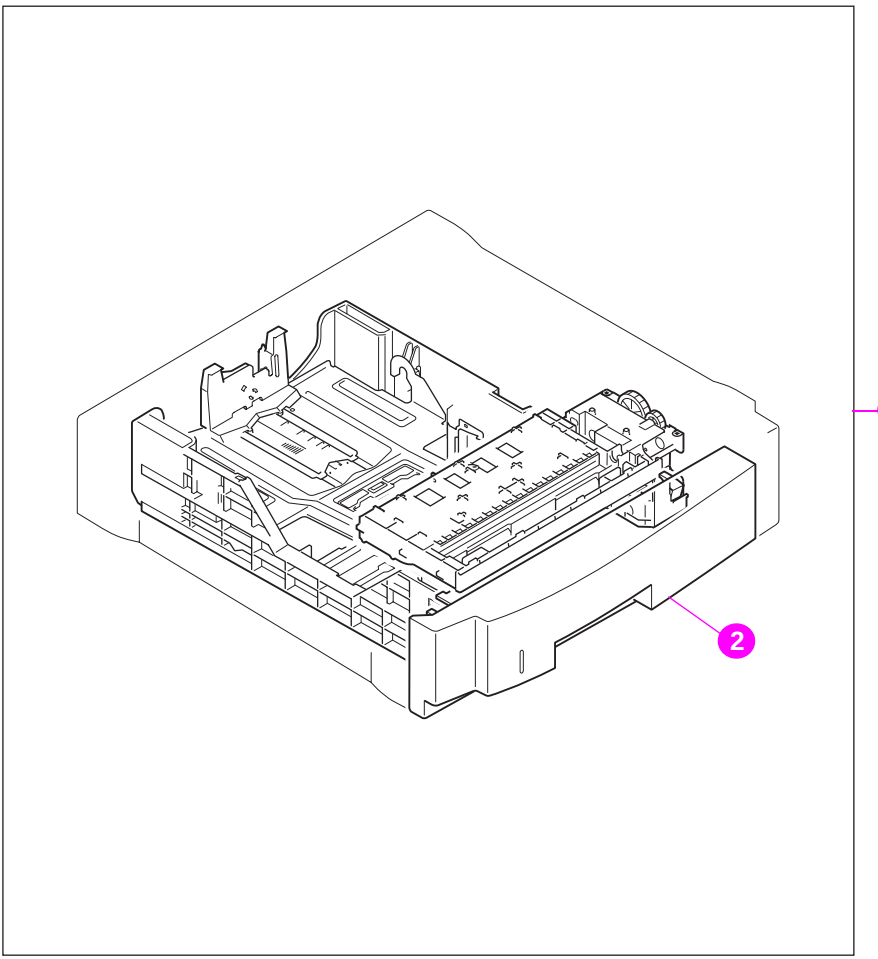


Figure 8-16 **500-sheet paper feeder main body assembly**

Table 8-17 500-sheet paper feeder main body assembly

Ref.	Description	Qty.	Part number
1	500-sheet paper feeder	1	R96-5001-000CN
2	500-sheet paper cassette	1	RG5-3900-000CN

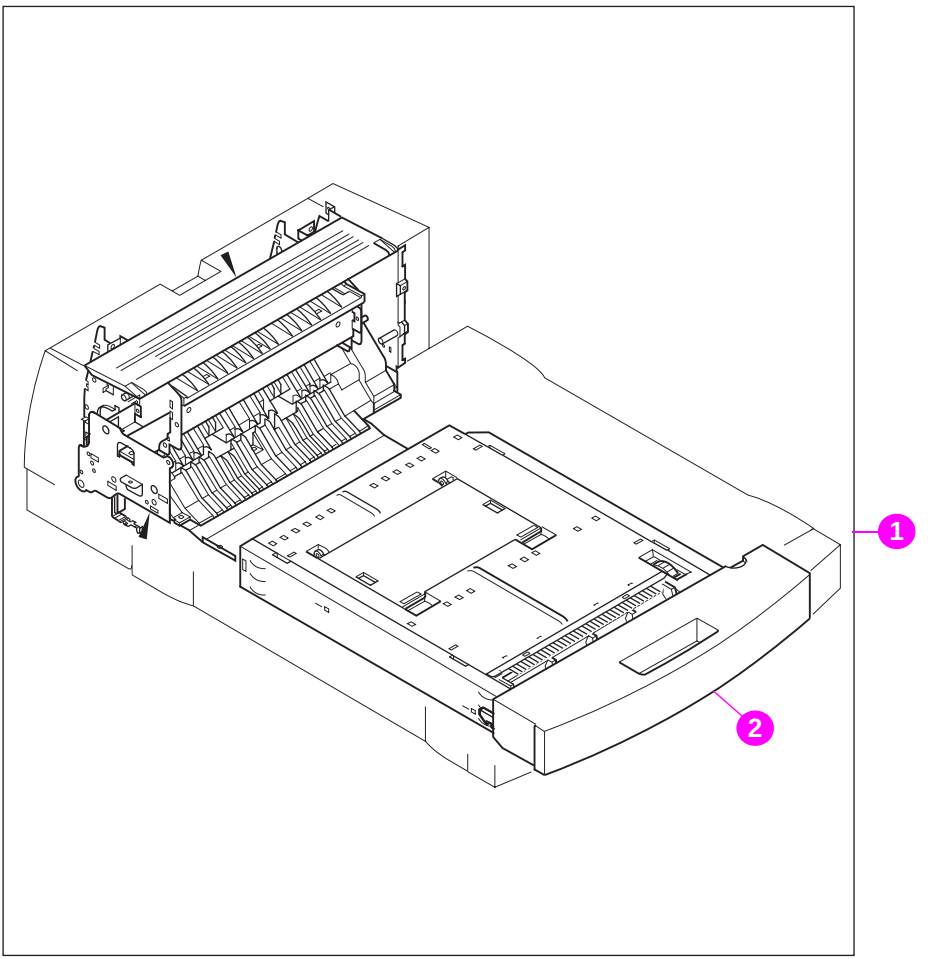


Figure 8-17 **Duplex unit main body printing accessory assembly**

Table 8-18 Duplex unit body printing accessory assembly

Ref.	Description	Qty.	Part number
1	Duplex unit	1	R96-5002-000CN
2	Duplexing feeder assembly	1	RG5-4055-000CN

Alphabetical parts list

Table 8-19 Alphabetical parts list

Part No.	Description	Figure	Reference
GR5-3900-000CN	500 sheet paper cassette	8-15	2
R96-5001-000CN	500-sheet paper feeder	8-5	1
XG9-0361-000CN	Bearing, ball	8-8	3
RG5-3309-000CN	Brake assembly	8-7	12
RB2-1158-000CN	Bushing	8-8	5
RS5-1293-000CN	Bushing	8-11	12
RG5-3886-000CN	Cable fusing connector	8-8	7
RG5-3802-000CN	Cable, control panel	8-4	4
RG5-3783-000CN	Cable, developer	8-5	2
RG5-3887-000CN	Cable, fan	8-6	1
RG5-4650-000CN	Cable, fan	8-8	3
RG5-3787-000CN	Cable, fusing/option	8-12	1
RG5-4651-000CN	Cable, ITB switch	8-10	1
RG5-3782-000CN	Cable, laser	8-8	8
RH2-5334-000CN	Cable, laser (flat)	8-8	9
RG5-3785-000CN	Cable, paper feed	8-11	28
RG5-3795-000CN	Cable, rotary	8-8	8
RH2-5335-000CN	Cable, videointerface	8-7	1
RG5-3400-000CN	Cassette, 250 sheet	8-15	1
RH7-5176-000CN	Clutch (CL2), electromagnetic	8-11	31
RH7-5178-000CN	Clutch (CL3), electromagnetic	8-12	16
RH7-5180-000CN	Clutch (CL4), electromagnetic	8-12	14
RB2-0572-000CN	Clutch, one-way	8-12	3
RB2-0561-000CN	Clutch, one-way	8-12	20
RB2-0561-000CN	Clutch, one-way	8-12	22
RG5-3345-000CN	Control panel assembly	8-4	5
RB2-1180-000CN	Cover, cable	8-8	4
RB2-1224-000CN	Cover, connector	8-4	2
RB2-0916-000CN	Cover, connector	8-13	3

Table 8-19 Alphabetical parts list (continued)

Part No.	Description	Figure	Reference
RG5-3315-000CN	Cover, drum drawer	8-4	8
RG5-3320-000CN	Cover, ITB drawer	8-4	8
RG5-3313-000CN	Cover, left side	8-4	9
RB2-1206-000CN	Cover, lower rear	8-4	10
RB2-1205-000CN	Cover, rear	8-4	12
RG5-3310-000CN	Cover, right front	8-4	3
RG2-1203-000CN	Cover, right side	8-4	1
RB1-9001-000CN	Cover, roller	8-15	2
RF5-2076-000CN	Cover, toner access	8-5	2
RG5-3300-000CN	Cover, top assembly	8-5	1
RG5-3809-000CN	DC controller PCB	8-3	1
RG5-3809-000CN	DC controller PCB	8-8	13
RG5-3281-000CN	Density sensor assembly	8-13	2
RG5-3811-000CN	Developing PCB	8-3	4
RG5-3811-000CN	Developing PCB	8-9	5
RG5-3291-000CN	Door switch assembly	8-8	11
RG5-3325-000CN	Door, rear access	8-4	11
RG5-3296-000CN	Drawer switch assembly	8-8	6
RG5-3319-000CN	Drum bushing assembly	8-6	7
RG5-3270-000CN	Drum drawer assembly	8-12	1
RG5-3170-000CN	Drum drive assembly	8-6	5
R96-5002-000CN	Duplex unit	8-16	1
RG5-4055-000CN	Duplexing feeder assembly	8-16	2
RG5-3335-000CN	Face-down delivery assembly	8-5	15
RH7-1346-000CN	Fan, large	8-8	1
RH7-1407-000CN	Fan, small	8-6	10
RG5-3226-000CN	Feeder assembly	8-9	3
RB2-1282-000CN	Filter, air (large)	8-6	16
RB2-1283-000CN	Filter, air (small)	8-6	9
C4080-69001CN	Formatter PCB	8-3	5
RG5-3310-000CN	Front cover assembly	8-4	3

Table 8-19 Alphabetical parts list (continued)

Part No.	Description	Figure	Reference
RG5-3250-000CN	Fuser, 110V	8-5	11
RG5-3251-000CN	Fuser, 220V	8-5	11
RG5-3228-000CN	Gear assembly	8-12	9
RS6-0151-000CN	Gear, 16T	8-12	15
RS6-0158-000CN	Gear, 17T	8-11	4
RS6-0158-000CN	Gear, 17T	8-11	4
RS6-0139-000CN	Gear, 18T	8-11	6
RS6-0139-000CN	Gear, 18T	8-12	4
RS6-0140-000CN	Gear, 18T	8-12	13
RS6-0157-000CN	Gear, 18T/14T	8-11	2
RS6-0148-000CN	Gear, 18T/52T	8-11	22
RS6-0141-000CN	Gear, 19T	8-11	7
RS6-0138-000CN	Gear, 20T	8-11	18
RS6-1063-000CN	Gear, 24T/37T	8-11	16
RS6-0149-000CN	Gear, 26T	8-11	28
RS6-0137-000CN	Gear, 26T/18T	8-12	8
RS6-0135-000CN	Gear, 27T	8-11	9
RS6-0135-000CN	Gear, 27T	8-11	10
RS6-0150-000CN	Gear, 29T	8-11	29
RS6-0150-000CN	Gear, 29T	8-11	30
RS6-0152-000CN	Gear, 29T	8-12	17
RS6-0145-000CN	Gear, 29T/17T	8-11	21
RS6-0134-000CN	Gear, 30T/16T	8-11	11
RS6-0136-000CN	Gear, 31T	8-11	13
RS6-0144-000CN	Gear, 34T/15T	8-11	20
RS6-0132-000CN	Gear, 35T	8-11	17
RS6-0143-000CN	Gear, 37T	8-11	26
RS6-0133-000CN	Gear, 37T/14T	8-11	19
RS6-0154-000CN	Gear, 39T/31T	8-12	11
RS6-0147-000CN	Gear, 47T	8-11	15
RS6-0153-000CN	Gear, 49T	8-12	12

Table 8-19 Alphabetical parts list (continued)

Part No.	Description	Figure	Reference
RS6-0146-000CN	Gear, 52T	8-11	23
RS6-0155-000CN	Gear, 53T	8-12	10
RS6-0156-000CN	Gear, 53T/46T	8-11	3
R6-0176-000CN	Gear 125T	8-8	4
RB2-1277-000CN	Guide, cable	8-7	4
RB2-1456-000CN	Guide, cable	8-8	10
RB2-1457-000CN	Guide, upper cable	8-8	1
RB2-1361-000CN	Handle, ITB drawer	8-5	8
RG5-3285-000CN	High voltage power supply	8-5	4
RG5-3242-000CN	ICL cam assembly	8-12	19
RB1-9009-000CN	Indicator, paper level	8-15	5
RG5-3397-000CN	ITB assembly	8-5	1
RG5-3241-000CN	ITB cam assembly	8-12	21
RG5-3235-000CN	ITB drawer assembly	8-5	7
RG5-3160-000CN	Laser/scanner assembly	8-8	7
RB2-0576-000CN	Lever, sensor	8-12	2
RB1-8974-000CN	Limiter, torque	8-15	3
RS5-2800-000CN	Link, rowel	8-12	25
RG5-3781-000CN	Main cable	8-7	2
WC2-5330-000CN	Microswitch, ITB	8-10	1
RH5-3227-000CN	Motor (M1), fusing assembly	8-11	24
RH7-1343-000CN	Motor(M1), stepping	8-11	14
RG5-3810-000CN	Paper feed PCB	8-3	3
RG5-3810-000CN	Paper feed PCB assembly	8-12	18
RG5-3816-000CN	Paper size sensor PCB	8-3	2
RG5-3235-000CN	Plate, support	8-12	27
RH3-2189-000CN	Power supply, 110V	8-6	3
RH3-2190-000CN	Power supply, 220V	8-6	3
RB2-1284-000CN	Rod, delivery	8-6	13
RB2-0744-000CN	Roller	8-3	1
RF5-2092-000CN	Roller	8-11	5

Table 8-19 Alphabetical parts list (continued)

Part No.	Description	Figure	Reference
RB2-0717-000CN	Roller	8-14	2
RB1-8865-000CN	Roller, paper pick	8-12	5
RF5-2490-000CN	Roller, separation	8-15	4
RF5-2112-000CN	Roller, transfer	8-7	3
RG5-3370-000CN	Rotary assembly	8-8	11
RG5-3360-000CN	Rotary drive assembly	8-8	6
RG5-4696-000CN	Rowel swing assembly	8-12	23
RG5-3235-000CN	Secondary transfer assembly	8-11	1
WG8-5362-000CN	Sensor, carousel position	8-8	10
RG5-3234-000CN	Sensor, paper size	8-11	27
RG5-3292-000CN	Sensor, waste toner	8-8	2
RB2-0545-000CN	Shaft, paper pick	8-11	6
RG5-3245-000CN	Solenoid assembly	8-11	8
RS5-6210-000CN	Spacer	8-8	2
RS5-2754-000CN	Spring, tension	8-6	14
RB2-0614-000CN	Spring, tension	8-12	24
RB2-1556-000CN	Strap, cover support	8-5	5
RG5-3355-000CN	Toner sensor assembly	8-8	9
RF5-2183-000CN	Transfer assembly, secondary	8-12	26
RG5-3240-000CN	Transfer cam assembly	8-12	7
RB2-1215-000CN	Tray, extension	8-4	7

Numerical parts list

Table 8-20 Numerical parts list

Part No.	Description	Figure	Reference
C4080-69001CN	Formatter PCB	8-3	5
R96-5001-000CN	500-sheet paper feeder	8-16	1
R96-5002-000CN	Duplex unit	8-16	1
RB1-8865-000CN	Roller, paper pick	8-12	5
RB1-8974-000CN	Limiter, torque	8-15	3
RB1-9001-000CN	Cover, roller	8-15	2
RB1-9009-000CN	Indicator, paper level	8-14	5
RB2-0545-000CN	Shaft, paper pick	8-11	6
RB2-0561-000CN	Clutch, one-way	8-12	20
RB2-0561-000CN	Clutch, one-way	8-12	21
RB2-0572-000CN	Clutch, one-way	8-12	3
RB2-0576-000CN	Lever, sensor	8-12	2
RB2-0614-000CN	Link, rowel	8-12	24
RB2-0717-000CN	Roller	8-14	2
RB2-0744-000CN	Roller	8-13	1
RB2-0916-000CN	Cover, connector	8-13	3
RB2-1158-000CN	Bushing	8-8	5
RB2-1180-000CN	Cover, cable	8-8	4
RB2-1203-000CN	Cover, right side	8-4	1
RB2-1205-000CN	Cover, rear	8-4	12
RB2-1206-000CN	Cover, lower rear	8-4	10
RB2-1215-000CN	Tray, extension	8-4	7
RB2-1224-000CN	Cover, connector	8-4	2
RB2-1277-000CN	Guide, cable	8-7	4
RB2-1282-000CN	Filter, air (large)	8-6	16
RB2-1283-000CN	Filter, air (small)	8-6	9
RB2-1284-000CN	Rod, delivery	8-6	13
RB2-1456-000CN	Guide, cable	8-8	10
RB2-1457-000CN	Guide, upper cable	8-8	1

Table 8-20 Numerical parts list (continued)

Part No.	Description	Figure	Reference
RB2-1556-000CN	Strap, cover support	8-6	5
RF5-2076-000CN	Cover, toner access	8-5	2
RF5-2092-000CN	Roller	8-11	5
RF5-2112-000CN	Roller, transfer	8-7	3
RF5-2138-000CN	Transfer assembly, secondary	8-12	26
RF5-2490-000CN	Roller, separation	8-15	4
RG5-3160-000CN	Laser/scanner assembly	8-8	7
RG5-3170-000CN	Drum drive assembly	8-6	5
RG5-3190-000CN	ITB drawer assembly	8-6	7
RG5-3226-000CN	Feeder assembly	8-9	3
RG5-3227-000CN	Motor (M1) fusing assembly	8-10	24
RG5-3228-000CN	Gear assembly	8-12	9
RG5-3234-000CN	Sensor, paper size	8-11	27
RG5-3235-000CN	Plate support	8-12	27
RG5-3235-000CN	Secondary transfer assembly	8-11	1
RG5-3240-000CN	Transfer cam assembly	8-12	7
RG5-3241-000CN	ITB cam assembly	8-12	20
RG5-3242-000CN	ICL cam assembly	8-12	19
RG5-3245-000CN	Solenoid assembly	8-11	8
RG5-3250-000CN	Fuser, 110V	8-6	11
RG5-3251-000CN	Fuser, 220V	8-6	112
RG5-3270-000CN	Drum drawer assembly	8-13	1
RG5-3281-000CN	Density sensor assembly	8-13	2
RG5-3285-000CN	High voltage power supply	8-5	1
RG5-3291-000CN	Door switch assembly	8-8	11
RG5-3292-000CN	Sensor, waste toner	8-8	2
RG5-3296-000CN	Drawer switch assembly	8-8	6
RG5-3300-000CN	Cover, top assembly	8-5	1
RG5-3309-000CN	Brake assembly	8-8	12
RG5-3310-000CN	Cover, right front	8-4	3
RG5-3313-000CN	Cover, left side	8-4	9

Table 8-20 Numerical parts list (continued)

Part No.	Description	Figure	Reference
RG5-3315-000CN	Cover, drum drawer	8-4	8
RG5-3319-000CN	Drum bushing assembly	8-6	12
RG5-3320-000CN	Cover, ITB drawer	8-4	6
RG5-3325-000CN	Door, rear access	8-4	11
RG5-3335-000CN	Face-down delivery assembly	8-5	15
RG5-3345-000CN	Control panel assembly	8-4	5
RG5-3355-000CN	Toner sensor assembly	8-8	9
RG5-3360-000CN	Rotary drive assembly	8-8	6
RG5-3370-000CN	Rotary assembly	8-8	11
RG5-3397-000CN	ITB assembly	8-5	1
RG5-3400-000CN	Cassette, 250 sheet	8-14	1
RG5-3781-000CN	Main cable	8-7	2
RG5-3782-000CN	Cable, laser	8-8	8
RG5-3783-000CN	Cable, developer	8-6	2
RG5-3785-000CN	Cable, paper feed	8-11	28
RG5-3787-000CN	Cable, fusing/option	8-12	1
RG5-3795-000CN	Cable, rotary	8-8	8
RG5-3802-000CN	Cable, control panel	8-4	4
RG5-3809-000CN	DC controller PCB	8-3	1
RG5-3809-000CN	DC controller PCB	8-8	1
RG5-3810-000CN	Paper feed PCB assembly	8-12	13
RG5-3810-000CN	Paper feed PCB	8-3	3
RG5-3811-000CN	Developing PCB	8-3	4
RG5-3811-000CN	Developing PCB	8-9	5
RG5-3816-000CN	Paper size sensor PCB	8-3	2
RG5-3886-000CN	Cable fusing connector	8-8	7
RG5-3887-000CN	Cable, fan	8-6	1
RG5-3900-000CN	500 sheet paper cassette	8-15	2
RG5-4055-000CN	Duplexing feeder assembly	8-16	2
RG5-4650-000CN	Cable, fan	8-8	3
RG5-4651-000CN	Cable, ITB switch	8-10	1

Table 8-20 Numerical parts list (continued)

Part No.	Description	Figure	Reference
RG5-4696-000CN	Rowel swing assembly	8-12	23
RH2-5334-000CN	Cable, laser (flat)	8-8	9
RH2-5335-000CN	Cable, videointerface	8-7	1
RH3-2189-000CN	Power supply, 110V	8-6	3
RH3-2190-000CN	Power supply, 220V	8-6	3
RH5-3227-000CN	Motor (M1), fusing assembly	8-11	24
RH7-1343-000CN	Motor(M1), stepping	8-11	14
RH7-1346-000CN	Fan, large	8-8	1
RH7-1407-000CN	Fan, small	8-6	10
RH7-5176-000CN	Clutch (CL2), electromagnetic	8-11	31
RH7-5178-000CN	Clutch (CL3), electromagnetic	8-12	16
RH7-5180-000CN	Clutch (CL4), electromagnetic	8-12	14
RS5-1293-000CN	Bushing	8-11	12
RS5-2754-000CN	Spring, tension	8-6	14
RS5-2800-000CN	Link rowel	8-12	25
RS5-6210-000CN	Spacer	8-8	2
RS6-0132-000CN	Gear, 35T	8-11	17
RS6-0133-000CN	Gear, 37T/14T	8-11	19
RS6-0134-000CN	Gear, 30T/16T	8-11	11
RS6-0135-000CN	Gear, 27T	8-11	9
RS6-0135-000CN	Gear, 27T	8-11	10
RS6-0136-000CN	Gear, 31T	8-11	13
RS6-0137-000CN	Gear, 26T/18T	8-12	8
RS6-0138-000CN	Gear, 20T	8-11	18
RS6-0139-000CN	Gear, 18T	8-12	4
RS6-0139-000CN	Gear, 18T	8-12	13
RS6-0140-000CN	Gear, 18T	8-11	6
RS6-0141-000CN	Gear, 19T	8-11	7
RS6-0143-000CN	Gear, 37T	8-11	26
RS6-0144-000CN	Gear, 34T/15T	8-11	20
RS6-0145-000CN	Gear, 29T/17T	8-11	21

Table 8-20 Numerical parts list (continued)

Part No.	Description	Figure	Reference
RS6-0146-000CN	Gear, 52T	8-11	23
RS6-0147-000CN	Gear, 47T	8-11	15
RS6-0148-000CN	Gear, 18T/52T	8-11	22
RS6-0149-000CN	Gear, 26T	8-11	25
RS6-0150-000CN	Gear, 29T	8-11	29
RS6-0150-000CN	Gear, 29T	8-11	30
RS6-0151-000CN	Gear, 16T	8-12	15
RS6-0152-000CN	Gear, 29T	8-12	17
RS6-0153-000CN	Gear, 49T	8-12	12
RS6-0154-000CN	Gear, 39T/31T	8-12	11
RS6-0155-000CN	Gear, 53T	8-12	10
RS6-0156-000CN	Gear, 53T/46T	8-11	3
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